

SCIENCE

Time Allowed : 3 hours

CLASS-X

Maximum Marks : 80

General Instructions :

- (i) This question paper consists of 39 questions in 5 sections.
- (ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- (iii) **Section A** consists of **20** objective type questions carrying **1 mark** each.
- (iv) **Section B** consists of **6** Very Short questions carrying **02 marks** each. Answers to these questions should be in the range of 30 to 50 words.
- (v) **Section C** consists of **7** Short Answer type questions carrying **03 marks** each. Answers to these questions should be in the range of 50 to 80 words.
- (vi) **Section D** consists of **3** Long Answer type questions carrying **05 marks** each. Answer to these questions should be in the range of 80 to 120 words.
- (vii) **Section E** consists of **3** source-based/case-based units of assessment of **04 marks** each with sub-parts.

SECTION : A

(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. The change in colour of the moist litmus paper in the given set up is due to

- (i) presence of acid
- (ii) presence of base
- (iii) presence of $H^+(aq)$ in the solution
- (iv) presence of Litmus which acts as an indicator

- (a) (i) and (ii)
- (b) Only (ii)
- (c) Only (iii)
- (d) Only (iv)

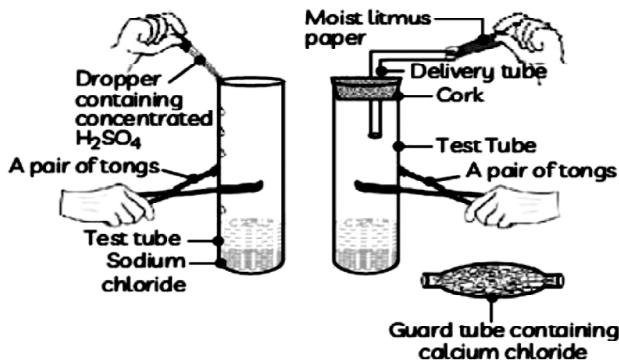
Ans. (c) Only (iii)

2. In the redox reaction



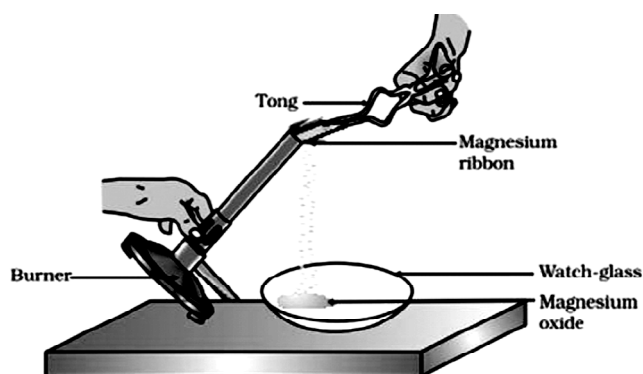
- (a) MnO_2 is reduced to $MnCl_2$ and HCl is oxidized to H_2O
- (b) MnO_2 is reduced to $MnCl_2$ and HCl is oxidized to Cl_2
- (c) MnO_2 is oxidized to $MnCl_2$ and HCl is reduced to Cl_2
- (d) MnO_2 is oxidized to $MnCl_2$ and HCl is reduced to H_2O

Ans. (b) MnO_2 is reduced to $MnCl_2$ and HCl is oxidized to Cl_2



3. Which of the following is the correct observation of the reaction shown in the alongside set up?

- (a) Brown powder of Magnesium oxide is formed.
 (b) Colourless gas which turns lime water milky is evolved.
 (c) Magnesium ribbon burns with brilliant white light.
 (d) Reddish brown gas with a smell of burning Sulphur has evolved.



Ans. (c) Magnesium ribbon burns with brilliant white light.

4. With the reference to four gases CO_2 , CO , Cl_2 and O_2 , which one of the options in the table is correct?

Option	Acidic oxide	Used in treatment of water	Product of respiration	Product of incomplete combustion
(a)	CO	Cl_2	O_2	CO
(b)	CO_2	Cl_2	CO_2	CO
(c)	CO_2	O_2	O_2	CO_2
(d)	CO	O_2	CO_2	CO_2

Ans. (b) CO_2 , Cl_2 , CO_2 , CO

5. On placing a copper coin in a test tube containing green ferrous sulphate solution, it will be observed that the ferrous sulphate solution

- (a) turns blue, and a grey substance is deposited on the copper coin.
 (b) turns colourless and a grey substance is deposited on the copper coin.
 (c) turns colourless and a reddish-brown substance is deposited on the copper coin.
 (d) remains green with no change in the copper coin.

Ans. (d) remains green with no change in the copper coin.

6. Anita added a drop each of diluted acetic acid and diluted hydrochloric acid on pH paper and compared the colors. Which of the following is the correct conclusion?

- (a) pH of acetic acid is more than that of hydrochloric acid.
 (b) pH of acetic acid is less than that of hydrochloric acid.
 (c) Acetic acid dissociates completely in aqueous solution.
 (d) Acetic acid is a strong acid

Ans. (a) pH of acetic acid is more than that of hydrochloric acid.

7. The formulae of four organic compounds are shown below. Choose the correct option

A	B	C	D
$\begin{array}{c} \text{H} & & \text{H} \\ & \diagdown & / \\ & \text{C} = \text{C} \\ & / & \diagdown \\ \text{H} & & \text{H} \end{array}$	$\begin{array}{c} \text{H} & & \text{O} \\ & & // \\ \text{H} - \text{C} - & \text{C} & \\ & & \backslash \\ \text{H} & & \text{O} - \text{H} \end{array}$	$\begin{array}{c} \text{H} & \text{H} \\ & \\ \text{H} - \text{C} - & \text{C} - \text{H} \\ & \\ \text{H} & \text{H} \end{array}$	$\begin{array}{c} \text{H} & \text{H} \\ & \\ \text{H} - \text{C} - & \text{C} - \text{O} - \text{H} \\ & \\ \text{H} & \text{H} \end{array}$

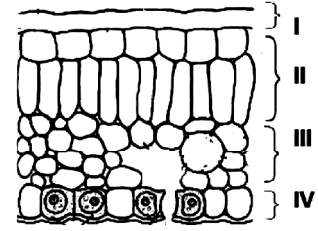
- (a) A and B are unsaturated hydrocarbons
 (b) C and D are saturated hydrocarbons
 (c) Addition of hydrogen in presence of catalyst changes A to C
 (d) Addition of potassium permanganate changes B to D

Ans. (c) Addition of hydrogen in presence of catalyst changes A to C

8. In the given transverse section of the leaf identify the layer of cells where maximum photosynthesis occurs.

- (a) I, II (b) II, III
(c) III, IV (d) I, IV

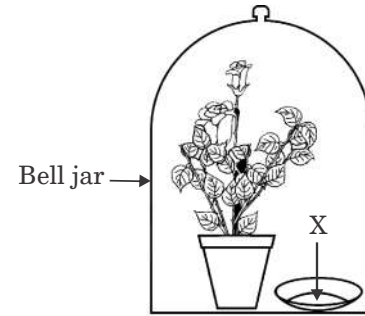
Ans. (b) II,III



9. Observe the experimental setup shown alongside. Name the chemical indicated as 'X' that can absorb the gas which is evolved as a byproduct of respiration.

- (a) NaOH
(b) KOH
(c) Ca(OH)₂
(d) K₂CO₃

Ans. (b) KOH

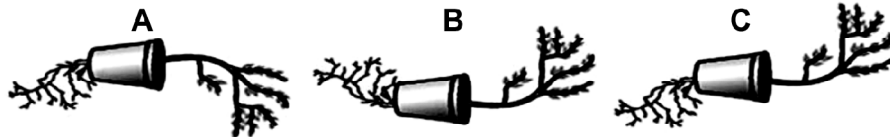


10. If a tall pea plant is crossed with a pure dwarf pea plant then, what percentage of F1 and F2 generation respectively will be tall?

- (a) 25%, 25% (b) 50%, 50% (c) 75%,100% (d) 100%, 75%

Ans. (d) 100%, 75%

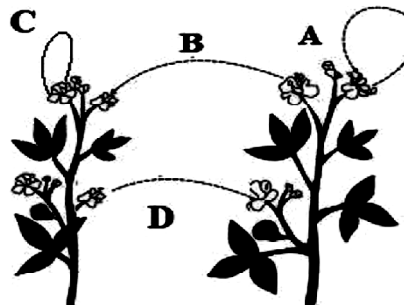
11. Observe the three figures given below. Which of the following depicts tropic movements appropriately?



- (a) B and C (b) A and C (c) B only (d) C only

Ans. (d) C only

12. The diagram shown below depicts pollination. Choose the options that will show a maximum variation in the offspring.



- (a) A, B and C (b) B and D (c) B, C and D (d) A and C

Ans. (b) B and D

13. A complete circuit is left on for several minutes, causing the connecting copper wire to become hot. As the temperature of the wire increases, the electrical resistance of the wire

- (a) decreases. (b) remains the same.
(c) increases. (d) increases for some time and then decreases.

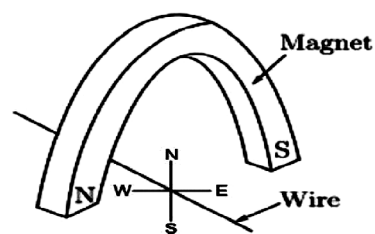
Ans. (c) increases.

14. A copper wire is held between the poles of a magnet.

The current in the wire can be reversed. The pole of the magnet can also be changed over. In how many of the four directions shown can the force act on the wire?

- (a) 1 (b) 2
(c) 3 (d) 4

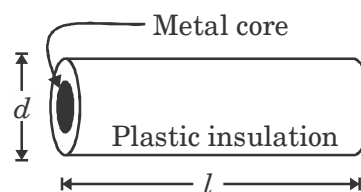
Ans. (b) 2 (Either North or South)



15. Plastic insulation surrounds a wire having diameter d and length l as shown alongside. A decrease in the resistance of the wire would be produced by an increase in the

- (a) length l of the wire
(b) diameter d of the wire
(c) temperature of the wire
(d) thickness of the plastic insulation

Ans. (b) diameter d of the wire



16. Which of the following pattern correctly describes the magnetic field around a long straight wire carrying current?

- (a) straight lines perpendicular to the wire. (b) straight lines parallel to the wire.
(c) radial lines originating from the wire. (d) concentric circles centred around the wire.

Ans. (d) The field consists of concentric circles centred around the wire.

(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is False but R is true

17. **Assertion** : Silver bromide decomposition is used in black and white photography.

Reason : Light provides energy for this exothermic reaction.

Ans. (c) A is true but R is false

18. **Assertion** : Height in pea plants is controlled by efficiency of enzymes and is thus genetically controlled.

Reason : Cellular DNA is the information source for making proteins in the cell.

Ans. (a) Both A and R are true and R is the correct explanation of A

19. **Assertion** : Amphibians can tolerate mixing of oxygenated and deoxygenated blood.

Reason : Amphibians are animals with two chambered heart

Ans. (c) A is true but R is false

20. **Assertion** : On freely suspending a current — carrying solenoid, it comes to rest in Geographical N–S direction.

Reason : One end of current carrying straight solenoid behaves as a North pole and the other end as a South pole, just like a bar magnet.

Ans. (a) Both A and R are true and R is the correct explanation of A

SECTION : B

(Q. no. 21 to 26 are very short answer questions.)

21. A clear solution of slaked lime is made by dissolving Ca(OH)_2 in an excess of water. This solution is left exposed to air. The solution slowly goes milky as a faint white precipitate forms. Explain why a faint white precipitate forms, support your response with the help of a chemical equation.

Ans. Calcium hydroxide reacts with Carbon dioxide present in the atmosphere to form Calcium carbonate which results in milkiness/white ppt/Formation of Calcium carbonate (1mark)

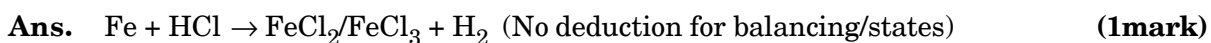


Or

Keerti added dilute Hydrochloric acid to four metals and recorded her observations as shown in the table given below :

Metal	Copper	Iron	Magnesium	Zinc
Gas Evolved	Yes	Yes	No	Yes

Select the correct observation(s) and give chemical equation(s) of the reaction involved.



22. How is the mode of action in beating of the heart different from reflex actions? Give four examples.

Ans.

Beating of heart	Reflex action
<ul style="list-style-type: none"> • Involuntary actions are the actions which are not controlled by our will. • They do not need any kind of stimulus to work. • These actions are regulated by the brain. • They do not involve skeletal muscle. • These actions are performed throughout one's life. • This action may be quick or slow. 	<ul style="list-style-type: none"> • Reflex actions are the sudden action in response to something. • They required stimulus for its action • These actions are regulated by the spinal cord. • They do involve skeletal muscle. • These actions are produced in response to on an event of an emergency. • Reflex actions are always quick.

Any four points ($\frac{1}{2} \times 4 = 2$ marks)

Examples of reflex action are :

(i) Closing of eyes when a bright light hits our eyes.

(ii) Blinking eyes when insects come in contact.

(iii) When we touch a hot pot hand moves away from it.

(iv) Batting of eyelids frequently.

23. Patients whose gallbladder are removed are recommended to eat less oily food. Why?

Ans. Gallbladder stores bile which helps in emulsification of lipids. (1 mark)

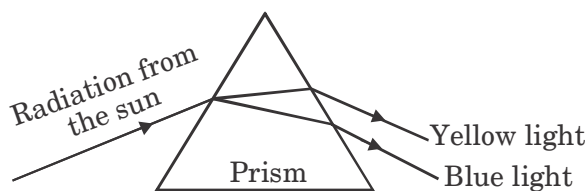
In the absence of stored bile, emulsification of fats will be negligible/affected/less and thus fat digestion will be slow. Hence there are such diet restrictions. (1 mark)

24. Name the substances other than water, that are reabsorbed during urine formation. What are the two parameters that decide the amount of water that is reabsorbed in the kidney?

Ans. Glucose, amino acids, salts and a major amount of water are selectively re-absorbed as the urine flows along the tube.

The amount of water reabsorbed depends on how much excess water there is in the body, and on how much of dissolved waste there is to be excreted.

25.



State the phenomena observed in the above diagram. Explain with reference to the diagram, which of the two lights mentioned above will have the higher wavelength?

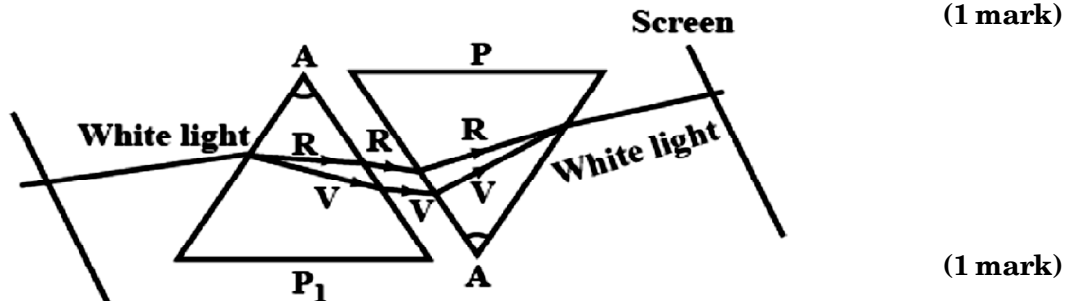
Ans. Dispersion—The splitting of white light into seven colours on passing through a prism. (1 mark)

Velocity is directly proportional to wavelength given constant frequency. So yellow will have greater wavelength than blue as the velocity of yellow light is greater than blue. (0.5 + 0.5 mark)

Or

How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light? Draw the diagram.

Ans. Angle of deflections of the two prisms need to be equal and opposite. While the first prism splits the light in the seven colours due to different angles of deflection, the second prism combines the spectrum along a single ray and the colours again combine to give white light as the emergent light. (1 mark)



26. A lot of waste is generated in neighborhood. However, almost all of it is biodegradable. What impact will it have on the environment or human health?

Ans. Excess generation of biodegradable wastes can be harmful as —

Its decomposition is a slow process leading to production of foul smell and gases. (1 mark)

It can be the breeding ground for germs that create unhygienic conditions. (1 mark)

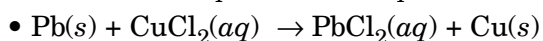
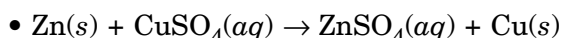
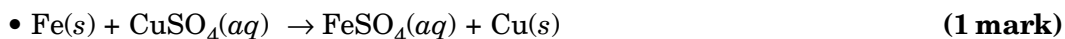
SECTION : C

(Q.no. 27 to 33 are short answer questions.)



Identify the types of reaction mentioned above in (i) and (ii). Give one example for each type in the form of a balanced chemical equation.

Ans. (i) Displacement (½ mark)



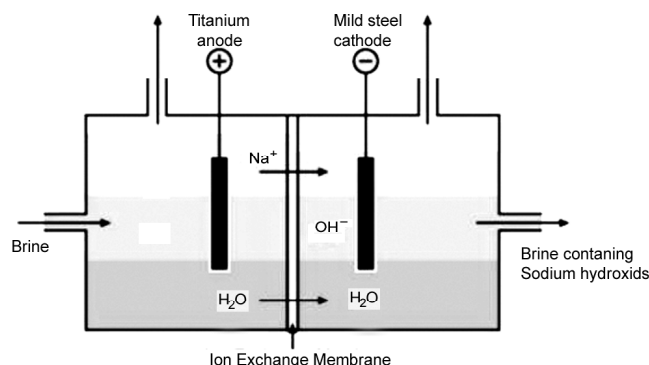
(Any one of the reaction or other displacement reaction.)

(ii) Double displacement (½ mark)



(Any one of the reaction or other double displacement reaction.)

28.



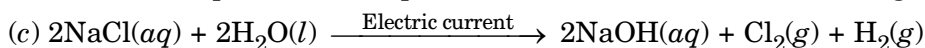
(a) Identify the gasses evolved at the anode and cathode in the above experimental set up.

(b) Name the process that occurs. Why is it called so?

(c) Illustrate the reaction of the process with the help of a chemical equation.

Ans. (a) Anode: Chlorine; Cathode: Hydrogen

(b) Chlor alkali process as the products obtained are alkali, chlorine gas and hydrogen gas



29. The leaves of a plant were covered with aluminium foil, how would it affect the physiology of the plant?

Ans. No photosynthesis will occur so no glucose will be made. Also no respiration will take place as no Oxygen will be taken in. (1 Mark)

No transpiration will occur so there would be no upward movement of water or minerals from the soil as there will be no transpirational pull. (1 Mark)

Temperature regulation of leaf surface will be affected. (1 Mark)

Or

How is lymph an important fluid involved in transportation? If lymphatic vessels get blocked, how would it affect the human body? Elaborate.

Ans. Lymph carries digested and absorbed fat from the intestine and drains excess fluid from extracellular space back into the blood. Blockage of lymphatic system will lead to water retention and poor fat absorption in the body.

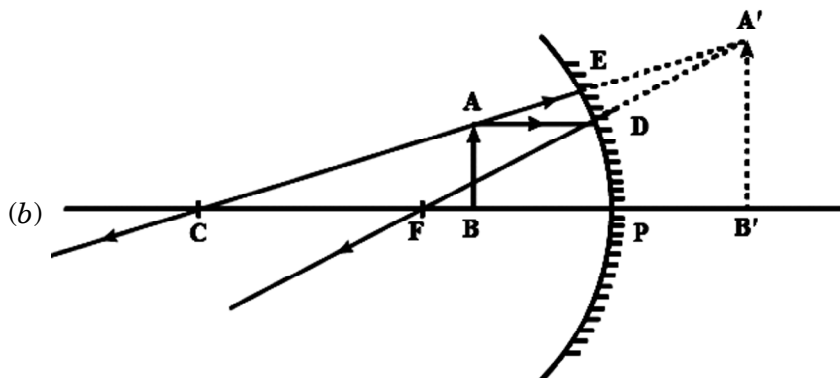
30. Rohit wants to have an erect image of an object using a converging mirror of focal length 40 cm.

(a) Specify the range of distance where the object can be placed in front of the mirror. Justify.

(b) Draw a ray diagram to show image formation in this case.

(c) State one use of the mirror based on the above kind of image formation.

Ans. (a) The object has to be placed at a distance between 0 - 40 cm. This is because image is virtual, erect and magnified when the object is placed between F and P. (1 mark)



(1 mark)

(c) Used as shaving mirror or used by dentists to get enlarged image of teeth (*any one use*)

(1 mark)

31. (a) A lens of focal length 5 cm is being used by Debashree in the laboratory as a magnifying glass. Her least distance of distinct vision is 25 cm. What is the magnification obtained by using the glass?

(b) Ravi kept a book at a distance of 10 cm from the eyes of his friend Hari. Hari is not able to read anything written in the book. Give reasons for this?

Ans. (a) Given, image distance = $v = .25$ cm, focal length = $f = 5$ cm, magnification = $m = ?$

$$\text{From lens formula, } \frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{u} = \frac{1}{v} - \frac{1}{f}$$

$$\frac{1}{u} = \frac{1}{-25} - \frac{1}{5} = \frac{-1-5}{25} = \frac{-6}{25}$$

$$\text{Object distance} = u = \frac{-25}{6} \text{ cm}$$

$$\text{We know that, } m = \frac{v}{u} = \frac{-25 \times 6}{-25} = 6 \quad (2 \text{ marks})$$

(b) This is because the least distance of distinct vision is 25 cm. (1 mark)

32. A student fixes a white sheet of paper on a drawing board. He places a bar magnet in the centre and sprinkles some iron filings uniformly around the bar magnet. Then he taps gently and observes that iron filings arrange themselves in a certain pattern.

(a) Why do iron filings arrange themselves in a particular pattern?

(b) Which physical quantity is indicated by the pattern of field lines around the bar magnet?

(c) State any two properties of magnetic field lines.

Ans. (a) When iron filings are placed in a magnetic field around a bar magnet, they behave like tiny magnets. The magnetic force experienced by these tiny magnets make them rotate and align themselves along the direction of field lines. (1 mark)

(b) The physical property indicated by this arrangement is the magnetic field produced by the bar magnet. (1 mark)

(c) Magnetic field lines never intersect, magnetic field lines are closed curves. (1 mark)

Or

A compass needle is placed near a current carrying wire. State your observations for the following cases and give reasons for the same in each case-

(a) Magnitude of electric current in wire is increased.

(b) The compass needle is displaced away from the wire.

Ans. (a) The deflection in the compass needle increases as Magnetic field of the current carrying conductor is directly proportional to current flowing through it. (1.5 marks)

(b) The deflection in the needle decreases as the magnetic field is inversely proportional to the perpendicular distance from the wire. (1.5 marks)

33. Why is damage to the ozone layer a cause for concern? What are its causes and what steps are being taken to limit this damage?

Ans. Damage to the ozone layer is a cause for concern because the ozone layer shields the surface of earth from harmful UV radiations from the sun which cause skin cancer in human beings.

Synthetic chemicals like chlorofluorocarbons (CFCs) which are used as refrigerants and in the fire-extinguishers are the main reason for the depletion of the ozone layer.

Steps taken to limit this damage—Many developing and developed countries have signed and are obeying the directions of UNEP (United Nations Environment Programme) to freeze or limit the production and usage of CFCs at 1986 levels. (1 × 3 = 3 marks)

SECTION : D*(Q.no. 34 to 36 are Long answer questions.)*

34. Shristi heated Ethanol with a compound A in presence of a few drops of concentrated sulphuric acid and observed a sweet smelling compound B is formed. When B is treated with sodium hydroxide it gives back Ethanol and a compound C.

(a) Identify A and C**(b) Give one use each of compounds A and B.****(c) Write the chemical reactions involved and name the reactions.**

Ans. (a) A — Ethanoic acid/ Or any other carboxylic acid, C — Sodium salt of ethanoic acid/ any other carboxylic acid/ sodium ethanoate (½ + ½ Mark)

(b) Use of A — dil solution used as vinegar in cooking/preservative in pickles (1 Mark)

Use of B — making perfumes, flavoring agent (1 Mark)

(c) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Conc H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$ (1 Mark)

$\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \xrightarrow{\text{Conc H}_2\text{SO}_4} \text{CH}_3\text{COONa} + \text{C}_2\text{H}_5\text{OH}$ (1 Mark)

Or

(a) What is the role of concentrated Sulphuric acid when it is heated with Ethanol at 443 K. Give the reaction involved.

(b) Reshu by mistake forgot to label the two test tubes containing Ethanol and Ethanoic acid. Suggest an experiment to identify the substances correctly? Illustrate the reactions with the help of chemical equations.

Ans. (a) Sulphuric acid acts as dehydrating agent (1 Mark)

$\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Conc H}_2\text{SO}_4, 443\text{K}} \text{C}_2\text{H}_4 + \text{H}_2\text{O}$ (1 Mark)

(b) By reaction with sodium carbonate/bi carbonate with the samples, ethanol will not react whereas ethanoic acid gives brisk effervescence (2 Marks)

$2\text{CH}_3\text{COOH} + \text{Na}_2\text{CO}_3 \rightarrow 2\text{CH}_3\text{COONa} + \text{H}_2\text{O} + \text{CO}_2$

Or

$\text{CH}_3\text{COOH} + \text{NaHCO}_3 \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O} + \text{CO}_2$ (1 Mark)

35. (a) Why is it not possible to reconstruct the whole organism from a fragment in complex multicellular organisms?

(b) Sexual maturation of reproductive tissues and organs are necessary link for reproduction. Elucidate.

Ans. (a) The reason is that many multi-cellular organisms are not simply a random collection of cells. Specialised cells are organised as tissues, and tissues are organised into organs, which then have to be placed at definite positions in the body. Therefore, cell-by-cell division would be impractical. (2 Marks)

(b) Sexual maturation of reproductive tissues is a necessary link for reproduction because of the need for specialised cell called germ-cells to participate in sexual reproduction. The body of the individual organism has to grow to its adult size, the rate of general body growth begins to slow down, reproductive tissues begin to mature. (1.5 Marks)

A whole new set of changes in the appearance of the body takes place like change in body proportions, new features appear. This period during adolescence is called puberty.

There are also changes taking place that are different between boys and girls. In girls, breast size begins to increase, with darkening of the skin of the nipples at the tips of the breasts. Also, girls begin to menstruate at around this time. Boys begin to have new thick hair growth on the face and their voices begin to crack. (1.5 Marks)

Or

(a) How are variations useful for species if there is drastic alteration in the niches?

(b) Explain how the uterus and placenta provide necessary conditions for proper growth and development of the embryo after implantation?

Ans. (a) If the niche were drastically altered, the population could be wiped out. However, if some variations were to be present in a few individuals in these populations, there would be some chance for them to survive. Variation is thus useful for the survival of species over time. **(2 Marks)**

(b) • The lining of the uterus thickens and is richly supplied with blood to nourish the growing embryo. **(½ Mark)**

• The embryo gets nutrition from the mother's blood with the help of placenta. It is embedded in the uterine wall. **(½ Mark)**

• It contains villi on the embryo's side of the tissue. On the mother's side are blood spaces, which surround the villi. **(½ Mark)**

• This provides a large surface area for glucose and oxygen to pass from the mother to the embryo. The developing embryo will also generate waste substances which can be removed by transferring them into the mother's blood through the placenta. **(1 Mark)**

• The child is born as a result of rhythmic contractions of the muscles in the uterus. **(½ Mark)**

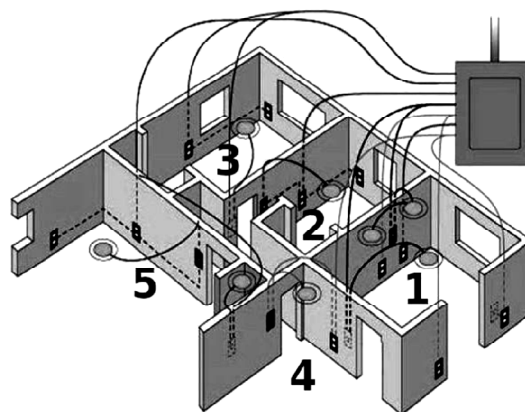
36. The diagram alongside is a schematic diagram of a household circuit. The house shown in the diagram has 5 usable spaces where electrical connections are made. For this house, the mains have a voltage of 220 V and the net current coming from the mains is 22A.

(a) What is the mode of connection to all the spaces in the house from the mains?

(b) The spaces 5 and 4 have the same resistance and spaces 3 and 2 have respective resistances of $20\ \Omega$ and $30\ \Omega$. Space 1 has a resistance double that of space 5. What is the net resistance for space 5.

(c) What is the current in space 3?

(d) What should be placed between the main connection and the rest of the house's electrical appliances to save them from accidental high electric current?



(1 mark)

(b) Let Resistance of Space 5 and 4 be R ohms respectively **(2 Marks)**

Resistance of Space 1 = $2R$ ohms

Resistance of Space 2 = 30 ohms

Resistance of Space 3 = 20 ohms

Current = 22 A

$V = 220\text{ V}$

Total Resistance = V/I

$$\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4} + \frac{1}{R_5} = \frac{1}{R_{eq}}$$

$$\frac{1}{2R} + \frac{1}{30} + \frac{1}{20} + \frac{1}{R} + \frac{1}{R} = \frac{1}{R_{eq}}$$

$$\frac{30 + 2R + 3R + 60 + 60}{60R} = \frac{1}{R_{eq}}$$

$$\frac{150 + 5R}{60R} = \frac{1}{R_{eq}}$$

$$R_{eq} = \frac{60R}{150 + 5R} = \frac{220^{10}}{22}$$

$$60R = 10(150 + 5R)$$

$$60R = 1500 + 50R$$

$$10R = 1500$$

$$R = 150 \Omega$$

$$(c) \quad V = 220 \text{ V} \quad (1 \text{ mark})$$

$$R = 20 \Omega$$

$$I = ?$$

$$\therefore V = IR$$

$$\therefore 220 = I \times 20$$

$$\text{Or} \quad I = \frac{220}{20} = 11 \text{ A}$$

(d) A fuse wire of appropriate rating should be placed in series with mains connection and rest of electrical appliances. (1 mark)

SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.

Internal choice is provided in one of these sub-parts.)

37. Two students decided to investigate the effect of water and air on iron object under identical experimental conditions. They measured the mass of each object before placing it partially immersed in 10 ml of water. After a few days, the object were removed, dried and their masses were measured. The table shows their results.

Student	Object	Mass of Object before Rusting in g	Mass of the coated object in g
A	Nail	3.0	3.15
B	Thin plate	6.0	6.33

(a) What might be the reason for the varied observations of the two students?

(b) In another set up the students coated iron nails with zinc metal and noted that, iron nails coated with zinc prevents rusting. They also observed that zinc initially acts as a physical barrier, but an extra advantage of using zinc is that it continues to prevent rusting even if the layer of zinc is damaged. Name this process of rust prevention and give any two other methods to prevent rusting.

Ans. (a) Rusting occurs in both A and B so there is an increase in mass. (1 Mark)

As the surface area of B is more, extent of rusting is more (1 Mark)

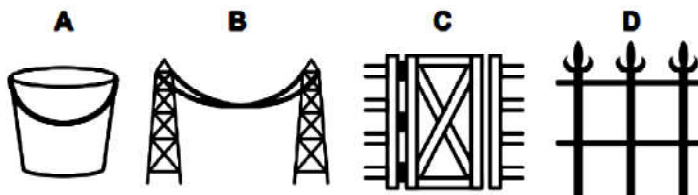
(b) Galvanization — (1 Mark)

Oiling/greasing/painting/alloying/chromium plating or any other

(any two ½ mark each)—(1 Mark)

Or

(b) In which of the following applications of Iron, rusting will occur most? Support your answer with valid reason.



A : Iron Bucket electroplated with Zinc

B : Electricity cables having iron wires covered with aluminium

C : Iron hinges on a gate

D : Painted iron fence

Ans. (b) C — Iron hinges on a gate —

Iron is in contact with both atmospheric oxygen and moisture/ water vapour. **(2 Marks)**

38. Pooja has green eyes while her parents and brother have black eyes. Pooja's husband Ravi has black eyes while his mother has green eyes and father has black eyes.

(a) On the basis of the above given information, is the green eye colour a dominant or recessive trait? Justify your answer.

(b) What is the possible genetic makeup of Pooja's brother's eye colour?

(c) What is the probability that the offspring of Pooja and Ravi will have green eyes? Also, show the inheritance of eye colour in the offspring with the help of a suitable cross.

Ans. (a) Yes, green eye colour is recessive as it will express only in homozygous condition

(1 Mark)

(b) BB, Bb

(1 Mark)

(c) bb***Bb**

(½ Mark)

	B	b
b	Bb	bb
b	Bb	bb

Genetic cross —

(1 Mark)

50% of the offsprings can have green eye colour.

(½ Mark)

Or

(d) 50% of the offspring of Pooja's brother are green eyed. With help of cross show how this is possible.

Ans. (c) Brother is heterozygous(Bb) and wife is green(bb) — (1)

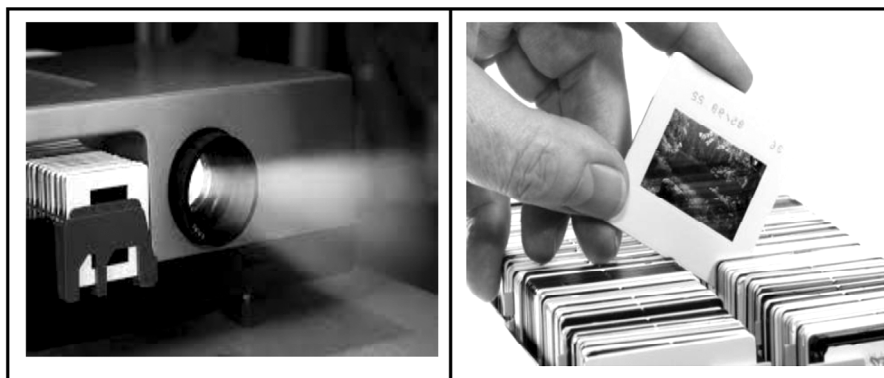
Wife bb***Bb** brother

	B	b
b	Bb	bb
b	Bb	bb

50% of the offsprings can have green eye colour as per the cross shown.

(1 Mark)

39.



The above images are that of a specialized slide projector. Slides are small transparencies mounted in sturdy frames ideally suited to magnification and projection, since they have a very high resolution and a high image quality. There is a

tray where the slides are to be put into a particular orientation so that the viewers can see the enlarged erect images of the transparent slides. This means that the slides will have to be inserted upside down in the projector tray.

To show her students the images of insects that she investigated in the lab, Mrs. Iyer brought a slide projector. Her slide projector produced a 500 times enlarged and inverted image of a slide on a screen 10 m away.

(a) Based on the text and data given in the above paragraph, what kind of lens must the slide projector have?

(b) If v is the symbol used for image distance and u for object distance then with one reason state what will be the sign for $\frac{v}{u}$ in the given case?

(c) A slide projector has a convex lens with a focal length of 20 cm. The slide is placed upside down 21 cm from the lens. How far away should the screen be placed from the slide projector's lens so that the slide is in focus?

Ans. (a) Convex Lens (1 Mark)

(b) Negative as the image is real and inverted. (1 Mark)

(c)

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{20} = \frac{1}{v} - \frac{1}{-20}$$

$$\frac{1}{v} = \frac{1}{20} - \frac{1}{21}$$

$$= \frac{(21 - 20)}{420} = \frac{1}{420}$$

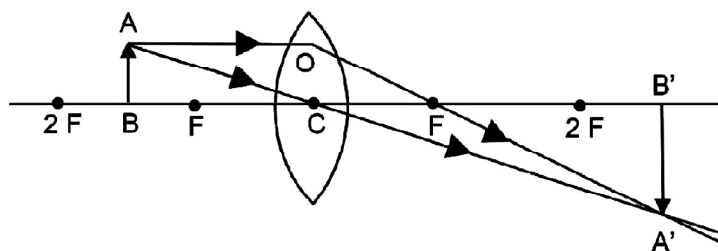
$$v = 420 \text{ cm}$$

(2 Marks)

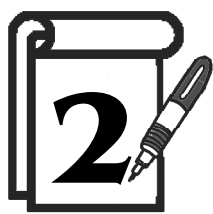
Or

(c) When a slide is placed 15 cm behind the lens in the projector, an image is formed 3 m in front of the lens. If the focal length of the lens is 14 cm, draw a ray diagram to show image formation. (not to scale)

Ans.



(2 Marks)



SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

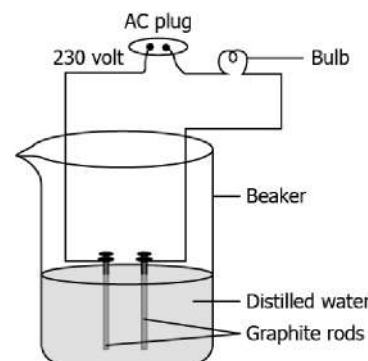
SECTION : A

(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. A student makes an arrangement to test the electrical conductivity of distilled water as shown.

The student observes that the bulb does not glow. What could be the reason the bulb does not glow?

- (a) the bulb needs DC source to glow
- (b) the water never conducts electricity
- (c) the graphite is bad conductor of electricity
- (d) the distilled water does not have ions present in it



2. $C_6H_{12}O_6(aq) + 6O_2(aq) \rightarrow 6CO_2(aq) + 6H_2O(l)$ 1

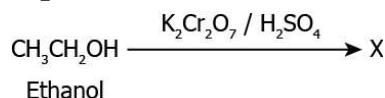
The above reaction is a/an

- (a) displacement reaction
- (b) endothermic reaction
- (c) exothermic reaction
- (d) neutralisation reaction

3. Reema took 5 ml of lead nitrate solution in a beaker and added approximately 4 ml of potassium iodide solution to it. What would she observe? 1

- (a) The solution turned red.
- (b) Yellow precipitate was formed.
- (c) White precipitate was formed.
- (d) The reaction mixture became hot.

4. The image represents a chemical reaction where ethanol is oxidised using potassium dichromate and sulphuric acid. 1



Which option represents the product "X" ?

- (a) CH_2O
- (b) CH_3CH
- (c) CH_3H_2O
- (d) CH_3COOH

5. A student adds an equal amount of copper sulphate solution in two beakers. He adds zinc in beaker P and silver in beaker Q. The student observes that the color of the solution in beaker P changes while no change is observed in beaker Q. Which option arranges the metals in increasing order of reactivity? 1

- (a) silver-zinc-copper
- (b) zinc-copper- silver
- (c) silver-copper-zinc
- (d) copper-silver-zinc

6. Which of the options in the given table are correct ?

1

Option	Natural source	Acid present
(i)	Orange	Oxalic acid
(ii)	Sour milk	Lactic acid
(iii)	Ant sting	Methanoic acid
(iv)	Tamarind	Acetic acid

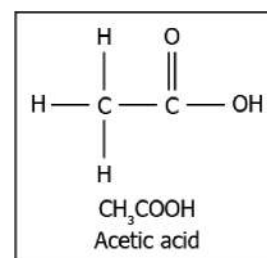
- (a) (i) and (ii) (b) (i) and (iv) (c) (ii) and (iii) (d) (iii) and (iv)

7. A student studies that acetic acid is a saturated compound. The structure of the compound is shown.

1

Why is acetic acid classified as a saturated compound?

- (a) because there is a the single bond between the carbon atoms
 (b) because there is a double bond between the carbon and oxygen atoms
 (c) because there is a single bond between the carbon and hydrogen atoms
 (d) because there is a single bond between the carbon and hydroxide diatom



8. The correct statements with reference to single celled organisms are :

1

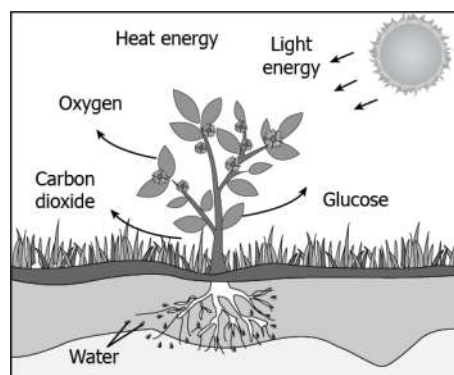
- (i) Complex substances are not broken down into simpler substances.
 (ii) Simple diffusion is sufficient to meet the requirement of exchange of gases.
 (iii) Specialised tissues perform different functions in the organism.
 (iv) Entire surface of the organism is in contact with the environment for taking in food.
 (a) (i) and (iii) (b) (ii) and (iii) (c) (ii) and (iv) (d) (i) and (iv)

9. The image shows the process of making food by a plant.

1

Which statement can be concluded from the image?

- (a) plants absorb CO_2 from air and H_2O from the soil as raw materials and convert them into glucose
 (b) plants absorb CO_2 from the soil and H_2O from air as raw materials and convert them into glucose
 (c) plants absorb CO_2 from air and glucose from the soil as raw materials and convert them into light energy
 (d) plants absorb CO_2 from air and minerals from the soil as raw materials and convert them into heat energy



10. Which statement explains the Mendel's law of segregation?

1

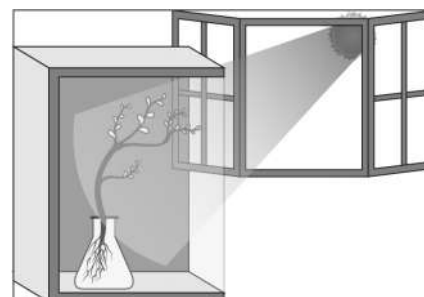
- (a) A trait in an offspring is due to the combination of an allele each from both the parent.
 (b) A trait in an offspring is due to the combination of two alleles each from both the parent.
 (c) A trait in an offspring is due to the combination of two alleles each from either of the parent.
 (d) A trait in an offspring is due to the combination of one allele each from either of the parent.

11. Akshay potted some germinated seeds in a pot. He put the pot in a cardboard box that was open from one side. He keeps the box in a way that the open side of box faces sunlight near his window. After 2-3 days he observes the shoot bends towards light as shown in image.

Which type of tropism he observes?

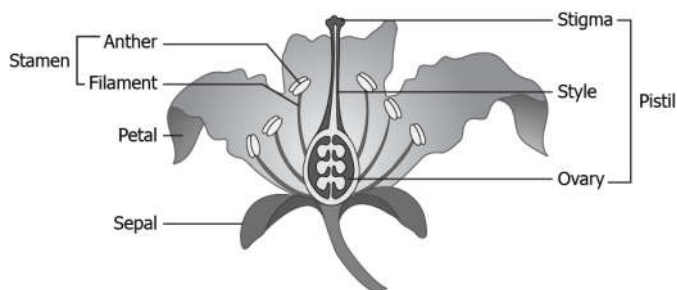
1

- (a) Geotropism (b) Phototropism
 (c) chemotropism (d) hydrotropism



12. The image shows the different parts of a flower.

1



Which part of the pistil is responsible for receiving pollen from stamen in order to perform reproduction?

- (a) anther (b) ovary (c) petal (d) stigma

13. How much more heat is produced, if current is doubled ?

1

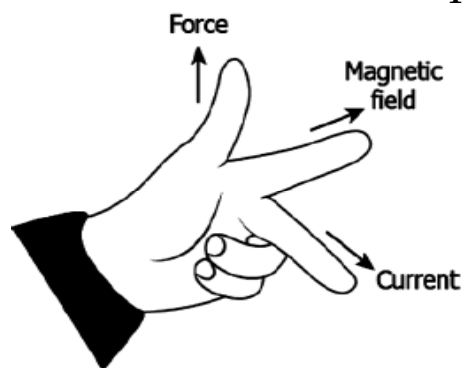
- (a) twice the original amount (b) thrice the original amount
(c) four times the original amount. (d) five times the original amount.

14. The image shows the Fleming's left-hand rule.

1

Which option explains the rule to understand the working of motor?

- (a) When a current carrying conductor is moved with a force, it creates the magnetic field.
(b) When a conductor is moved inside a magnetic field, current is produced in the conductor.
(c) When magnetic field is moved relative to the conductor, current is produced in the conductor.
(d) When a current carrying conductor placed in a magnetic field, it experiences a force by magnetic field.

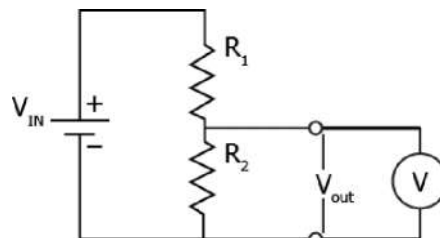


15. The image shows a circuit diagram.

1

What is being measured using the voltmeter?

- (a) current in the circuit
(b) voltage in the circuit
(c) voltage across the resistor
(d) resistance offered by the resistor



16. A charged body at rest produces

1

- (a) electric field only (b) magnetic field only
(c) neither electric and magnetic field (d) Both electric and magnetic field

(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is False but R is true

17. **Assertion** : Decomposition of vegetable matter into compost is an endothermic reaction.

Reason : Decomposition reaction involves breakdown of a single reactant into simpler products. 1

18. **Assertion** : Both TT and Tt are tall plants.

Reason : A single copy of 'T' is enough to make the plant Tall. 1

- 19. Assertion :** Resins and gums are stored in old xylem tissue in plants.
Reason : Resins and gums facilitate transport of water molecules. **1**
- 20. Assertion :** At every point of a current-carrying circular loop, the concentric circles representing the magnetic field around it would become larger and larger as we move away from the wire.
Reason : Magnetic field produced by a current-carrying straight wire depends inversely on the distance from it. **1**

SECTION : B*(Q. no. 21 to 26 are very short answer questions.)*

- 21.** State the number of water molecules present in crystals of washing soda and Plaster of Paris. What are these water molecules called as ? **2**

Or

A copper plate was dipped into a solution of silver nitrate. After sometime, a black layer was observed on the surface of copper plate. State the reason for it and write chemical equation of the reaction involved. **2**

22. The brain is contained in a fluid filled balloon like structure. Mention the purpose served by the fluid in this structure. Cranium and vertebral column protect two vital organs of central nervous system. Name these organs. Mention two types of nerves arising from these organs. **2**

23. Why is nitrogen considered an essential element ? How do plants acquire nitrogen ? **2**

24. Mention the pathway of urine starting from the organ of its formation. Name four substances which are re-absorbed from the initial filtrate in the tubular part of the nephron. **2**

25. Make a well labelled diagram showing refraction of light through a glass prism and mark the following : **2**

- | | | |
|-------------------------|------------------------|------------------------|
| (a) Incident ray | (b) Emergent ray | (c) Refracted ray |
| (d) Angle of refraction | (e) Angle of incidence | (f) Angle of deviation |
| (g) Angle of emergence | (h) Angle of prism | |

Or

Explain how retina sends images to the brain and how brain helps in producing a sense of vision.

26. The environmental conditions in rural areas are better as compared to the urban areas. Do you agree with this statement ? Give reasons for your answer. **2**

SECTION : C*(Q.no. 27 to 33 are short answer questions.)*

27. Classify the following as exothermic and endothermic reactions :

- | | |
|----------------------------|---------------------------|
| (a) Photosynthesis | (b) Respiration |
| (c) Burning of natural gas | (d) Electrolysis of water |

28. Identify the compound of calcium which is yellowish white powder and is used for disinfecting drinking water. How is it manufactured ? Write the chemical equation for the reaction involved. Mention its two industrial applications. **3**

29. Give reasons : **3**

- (i) The two ventricles have thicker muscular walls than the two atria in human heart.
(ii) The capillaries have walls which are one-cell thick.

Or

State reasons for the following :

- (i) The inner wall of the alimentary canal is not digested.
(ii) Valves are present between the left atrium and left ventricle as well as right atrium and right ventricle.

30. If the image formed by a spherical mirror for all positions of the object placed in front of it is always erect and diminished, what type of mirror is it ? Draw a labelled ray diagram to support your answer. **3**

31. A ray of light enters into benzene from air. If the refractive index of benzene is 1.50, by what percent does the speed of light reduce on entering the benzene ? **3**

32. A current carrying freely suspended solenoid rests in north-south direction. Justify this statement with reason. **3**

Or

State the rule for finding the direction of the magnetic field produced around a current carrying conductor.

33. Explain the formation of ozone in the higher levels of atmosphere, giving relevant chemical equations. **3**

SECTION : D

(Q.no. 34 to 36 are Long answer questions.)

34. A compound A($C_2H_4O_2$) reacts with Na metal to form a compound 'B' and evolves a gas which burns with a pop sound. Compound 'A' on treatment with an alcohol 'C' in presence of an acid forms a sweet smelling compound 'D' ($C_4H_8O_2$). On addition of NaOH to 'D' gives back B and C. Identify A, B, C and D write the reactions involved. **5**

Or

Vegetable oils generally have long unsaturated carbon chains. Give the chemical reaction for hydrogenation of vegetable oils. Name the catalyst used in the reaction. What role does a catalyst play in the reaction ?

35. Answer the following :

- Name any three asexual modes of reproduction.
- Explain with diagram the method by which an *Amoeba* reproduces.
- How is fission different from fragmentation ?

5

Or

(a) Write the function of following parts in human female reproductive system :

- Ovary
- Oviduct
- Uterus

(b) Describe in brief the structure and function of placenta.

36. (a) We connect electrical devices in parallel with the battery instead of connecting them in series. Why ?

(b) An electric oven connected to a 220 V line has two resistance coils A and B, each of 20Ω resistance, which may be used separately, in series, or in parallel. What are the currents in the three cases ? **5**

SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.)

Internal choice is provided in one of these sub-parts.)

37. Most metals undergo similar kind of reactions. Some are more reactive than others. Metals along with hydrogen (a non-metal) are arranged in order of their reactivity in a series called activity series. More reactive metal displace less reactive metal from its salt solution.

Potassium	most reactive	K
Sodium		Na
Calcium		Ca
Magnesium		Mg
Aluminium		Al
Zinc		Zn
Iron		Fe
Tin		Sn
Lead		Pb
(Hydrogen) N.M.		(H)
Copper		Cu
Silver		Ag
Gold		Au
Platinum	least reactive	Pt

(a) Give reason why the metals at the top of reactivity series are more reactive than the metals at the bottom. **1**

(b) On the basis of following two displacement reactions, write the correct order of the reactivity of the metals A, B and C. 1



(c) How does the electro positivity of metals change on moving up to down in reactivity series of metals? Name two least electro positive metals. 2

Or

(d) How does the reducing power of metals change on moving up to down in reactivity series of metals? Name one metal which acts as the strongest reducing agent.

38. Heredity and Variations

Inheritance is the process by which genetic information is passed on from parent to progeny; it is the basis of heredity. Inheritance depicts the pathway of the genetic traits and describes how genetic material is passed on from parent to child. Heredity is the phenomenon of passing of characters from parents to offspring through genes. Variation is the degree by which progeny differ from their parents. Variations arising during the process of reproduction can be inherited. These variations may lead to increased survival of the individuals. Sexually reproducing individuals have two copies of genes for the same trait. Traits in one individual may be inherited separately, giving rise to new combinations of traits in the offspring of sexual reproduction.

(a) What information does the inheritance provide to an organism from previous generation to next generation? 1

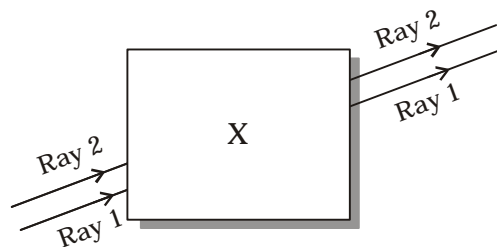
(b) Name the process by which the number of successful variations are maximised. 1

(c) What are acquired traits? Why acquired traits are not inherited? 2

Or

(d) What are genes? How they are important in genetics?

39. Ritu, a young student, was trying to demonstrate some properties of light in her Science Project Work. She kept 'X' inside the box (as shown in the figure) and with the help of a laser pointer made light rays pass through the holes on one side of the box. She had a small butter-paper screen to see the spots of light being cast as they emerged.



(a) What could be the 'X' that she placed inside the box to make the rays behave as shown? Also give the name of phenomenon shown by 'X'. 1

(b) She measured the angles of incidence for both the rays on the left side of the box to be 48.6° . She knew the refractive index of the material 'X' inside the box was 1.5. What will be the approximate value of angle of refraction? (Use the value: $\sin 48.6^\circ \rightarrow 0.75$) 1

(c) Write two observations/conclusions which can be derived from this demonstration. 2

Or

(d) State Snell's Law and write its formula.

Answers

- (d) the distilled water does not have ions present in it
- (c) exothermic reaction
- (b) Yellow precipitate was formed.
- (d) CH_3COOH
- (c) silver-copper-zinc
- (c) (ii) and (iii)
- (a) because there is a the single bond between the carbon atoms
- (c) (ii) and (iv)

9. (a) plants absorb CO_2 from air and H_2O from the soil as raw materials and convert them into glucose

10. (a) A trait in an offspring is due to the combination of an allele each from both the parent.

11. (b) Phototropism

12. (d) stigma

13. (b) thrice the original amount

14. (d) When a current carrying conductor placed in a magnetic field, it experiences a force by magnetic field.

15. (c) voltage across the resistor

16. (d) Both electric and magnetic field

17. (d) A is False but R is true

18. (a) Both A and R are true and R is the correct explanation of A

19. (c) A is true but R is false

20. (a) Both A and R are true and R is the correct explanation of A

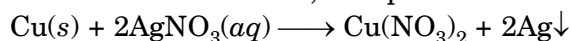
21. • Washing soda : 10 molecules of water, $(\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O})$

Plaster of Paris : $\frac{1}{2}$ molecule of water, $(\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O})$

• These molecules are called as water of crystallisation.

Or

As copper metal is more reactive than silver so, it displaces silver from the solution.



22. • The fluid outside the brain, facilitates shock absorption.

- The cranium protects the brain.
- The vertebral column protects the spinal cord.
- Cranial nerves arise from brain/brain stem.
- Spinal nerves arise from spinal cord.

23. • Nitrogen is a major component of chlorophyll. It is also a component of amino acids which are called building blocks of proteins.

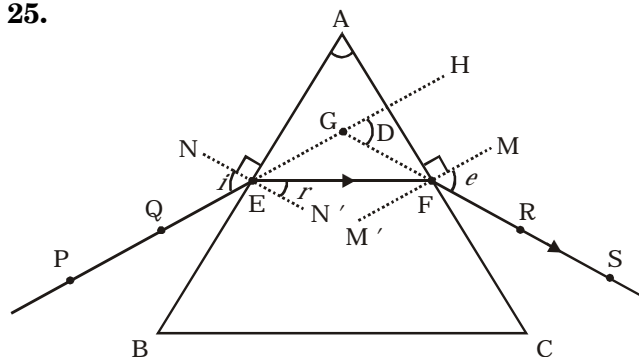
- Plants obtain nitrogen from the soil in the form of inorganic nitrates or nitrites.

24. • The urine is formed in the kidney and then it enters into a long tube, the ureter, which connects the kidneys with the urinary bladder.

- Urine is stored in urinary bladder until it is passed out through urethra.

• The substances like glucose, amino acids, salts and major amount of water are selectively reabsorbed as it flows along the tube.

25.



PE — Incident ray

EF — Refracted ray

FS — Emergent ray

$\angle A$ — Angle of prism

$\angle i$ — Angle of incidence

$\angle r$ — Angle of refraction

$\angle e$ — Angle of emergence

$\angle D$ — Angle of deviation

Or

The eye lens forms an inverted real image of the object on the retina. The retina is a delicate membrane having enormous number of light sensitive cells. The light sensitive cells get activated upon illumination and generate electrical signals. These signals are sent to the brain via the optic nerves. The brain interprets these signals and processes the information. So, that we perceive object.

26. Yes, I agree with this statement. The pollution level in rural areas is very less in comparison to that of urban areas. Further, the use of plastic bags, cups, etc. which creates soil pollution is also less in rural areas.

27. (a) Photosynthesis – Endothermic reaction.

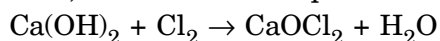
(b) Respiration – Exothermic reaction.

(c) Burning of natural gas – Exothermic reaction.

(d) Electrolysis of water – Endothermic reaction.

28. (i) Compound is bleaching powder [Calcium oxychloride (CaOCl_2)].

(ii) Bleaching powder is produced by the action of chlorine on dry slaked lime [Ca(OH)_2]. In other words, when chlorine is passed over dry slaked lime, bleaching powder is formed.



(iii) Bleaching powder is used for :

(a) Bleaching cotton and linen in textile industry.

(b) Bleaching wood pulp in paper factories.

(c) Bleaching washed clothes in laundry.

(d) Disinfecting drinking water to make it germ free.

(Any two points)

29. (i) Through contraction of ventricles, the blood is forced to pump to various body organs, all over the body so the walls of ventricles are thicker to tolerate this high pressure than the walls of auricles (atria) which has to pass its blood into ventricles located just below the auricles.

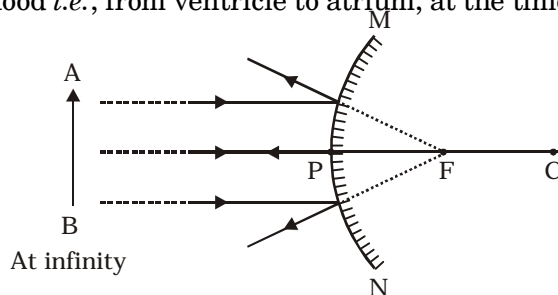
(ii) The capillaries have walls which are one-cell thick. These help in the exchange of materials between the blood and surrounding cells across themselves.

Or

(i) The inner wall of the alimentary canal is covered with mucus which prevents it from the effects of digestive enzymes and hence it is not digested.

(ii) The valves present between left atrium and left ventricle as well as right atrium and right ventricle allow the flow of blood only in one direction *i.e.*, from atrium to ventricle and prevent the back flow of blood *i.e.*, from ventricle to atrium, at the time of ventricular contraction.

30. Convex mirror



31. Refractive index, $x = \frac{\text{speed of light in vacuum}(\lambda)}{\text{speed of light in benzone}(\lambda)}$

Here

$$n = 1.5$$

\therefore

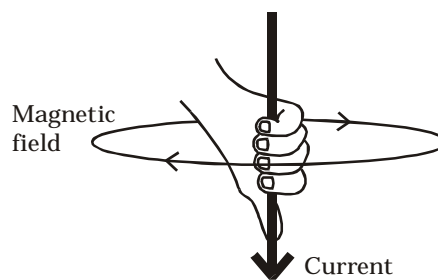
$$v = \frac{3 \times 10^8}{1.5} \text{ m/s} = 2 \times 10^8 \text{ m/s}$$

$$\% \text{ decrease} = \frac{(3 - 2) \times 10^8}{3 \times 10^8} \times 100\% = 33.33\%$$

32. Pattern of the magnetic field around a solenoid looks similar to that around a bar magnet. One end of the solenoid behaves as north pole while other as south pole. A current carrying solenoid when freely suspended, sets itself in the north-south direction, like a bar magnet.

Or

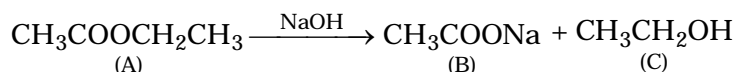
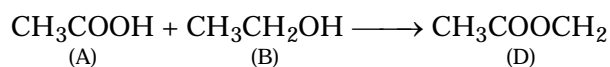
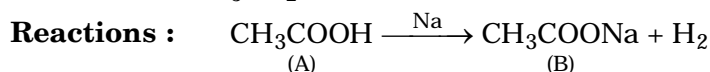
Direction of the magnetic field is determined by the right-hand thumb rule. It states that if we hold a current carrying conductor in our right hand such that the thumb points towards the direction of current then the wrapped fingers will give the direction of the magnetic field.



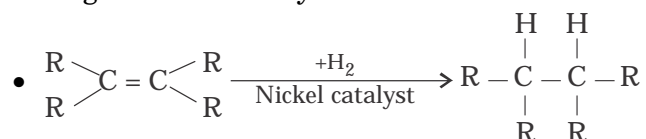
33. Ozone layer at the higher levels of atmosphere is a product of ultraviolet (UV) radiation acting on oxygen (O_2) molecule. The higher energy UV radiations split apart some molecular oxygen (O_2) into free oxygen (O) atoms. These atoms then combine with the molecular oxygen to form ozone as shown :



34. A is acetic acid, CH_3COOH which reacts with Na to form CH_3COONa and H_2 gas which burns with a pop sound. Treatment of acetic acid with ethanol produces ethyl ethanoate, a sweet smelling ester. Ethyl ethanoate on reaction with NaOH produces sodium acetate and ethanol. Thus.

A = Acetic acid, CH_3COOH B = Sodium ethanoate, CH_3COONa C = Ethanol, CH_3CH_2OH D = Ethyl ethanoate, $CH_3COOCH_2CH_3$ **Or**

• Unsaturated hydrocarbons add hydrogen in the presence of catalysts such as palladium or nickel to give saturated hydrocarbons. Such reactions are called addition reactions.



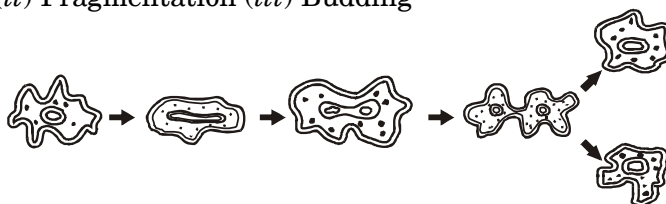
This reaction is commonly used in the hydro-genation of vegetable oils using a nickel catalyst. Vegetable oils generally have long unsaturated carbon chains while animal fats have saturated carbon chains.

• Animal fats generally contain saturated fatty acids which are said to be harmful for health while some vegetable oils are healthy.

• Catalysts are substances that cause a reaction to occur or proceed at a different rate without itself being affected.

35. (a) (i) Fission (ii) Fragmentation (iii) Budding

(b)



Amoeba reproduces by the process of binary fission. During the binary fission, the nuclear division is followed by appearance of a constriction in the cell membrane. The cell membrane

grows inwards deepening the constriction and from near the middle of the parents body, two cells get separated by having the cytoplasm and nucleus in each cell.

(c)	Fission	Fragmentation
	(i) It takes place in uni-cellular organisms like <i>Amoeba</i> , <i>Paramoecium</i> or <i>Leishmania</i> etc.	(i) It takes place in multi-cellular organisms like <i>Spirogyra</i> having simple body organisation.
	(ii) The cell divides into two (binary fission) or many (multiple fission) new cells.	(ii) The body of the organism divides into usually two or more parts which grow independently as new organisms.

Or

- (a) (i) **Ovary** :
- They produce female gametes called ova.
 - They also produce the female hormone estrogen.
- (ii) **Oviduct** :
- Carries the mature egg to the uterus.
 - The oviduct provides the place for fertilisation to ovum.
- (iii) **Uterus** :
- It has a thick muscular wall and a central cavity with an inner lining that is richly supplied with blood vessels.
 - It provides nourishment for the embryo.

(b) **Placenta** : It is a disk like structure in the uterus of pregnant mother, nourishing and maintaining the foetus through the umbilical cord. It also helps in removal of wastes.

36. (a) • In parallel, the current supplied to the devices are different so when one device fails to work other devices continue to work.

- The value of total resistance is low in parallel.

Parallel combination is useful as each device has different resistance and requires different current to operate.

- (b) • In separately connection of coils,

$$V = IR$$

$$I = \frac{V}{R} = \frac{220}{20} = 11 \text{ A}$$

$$\boxed{I = 11 \text{ A}} \quad \text{Current in separately}$$

- In series combination, total resistance of coils = $20 \Omega + 20 \Omega = 40 \Omega$.

$$V = 220 \text{ V}$$

So, $V = IR$

$$220 = I \times 40$$

$$\boxed{5.5 \text{ A} = I}$$

Current in series combination of coils

- In parallel combination, total resistance of coils

$$= \frac{1}{20} + \frac{1}{20} = \frac{2}{20} \Omega$$

$$\frac{1}{R_p} = \frac{1}{10} \Omega \Rightarrow R_p = 10 \Omega$$

$$V = 220 \text{ V}$$

$$V = IR$$

$$220 = I \times 10$$

$$\boxed{I = 22 \text{ A}}$$

Current in parallel combination of coils

37. (a) Metals at the top of the reactivity series lose electrons more easily than the metals at the bottom of the series.

(b) $C > A > B$

(c) Metals present at the top of the reactivity series are highly electropositive metals. The electropositive character of metals decreases as we go down the series.

Pt and Au are least electro positive metals.

Or

(d) The reducing power of metals decreases as we go down the reactivity series of metals.

Potassium is the strongest reducing agent.

38. (a) Inheritance from the previous generation provides both a common basic body design, and subtle changes in it, for the next generation.

(b) The number of successful variations are maximised by the process of sexual reproduction.

(c) The traits which an organism develops over the course of their lives are called acquired traits. These characteristics are not inherited because they are caused by non-reproductive tissues.

Or

(d) A gene is a short segment of DNA which contains instructions to make protein molecules. Proteins perform various functions in our body to keep us healthy. Each gene carries instructions that determine our features, such as eye colour, hair colour and height.

39. (a) 'X' is a parallel-sided glass block (glass slab) which show the phenomenon of refraction.

(b) The approximate value of angle of refraction will be 30° .

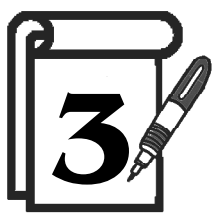
(c) (i) Air is optically rarer medium than glass.

(ii) The ratio: sin of angle of incidence in the first medium to the ratio of sin of angle of refraction in the second medium, gives the refractive index of the second material with respect to the first one.

Or

(d) Snell's law states that, for a given pair of media, the ratio of the sine of the angle of incidence θ_1 and angle of refraction θ_2 is equal to the ratio of velocities of light (v_1 / v_2) in the two media, or equivalently, to the refractive indices (n_2 / n_1) of the two media.

$$\frac{\sin \theta_1}{\sin \theta_2} = \frac{v_1}{v_2} = \frac{n_2}{n_1} \quad \text{Or} \quad n_1 \sin \theta_1 = n_2 \sin \theta_2$$



SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

SECTION : A

(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. Consider the pH value of the following acidic samples :

1

The decreasing order of their H^+ ion concentration is :

- (a) $3 > 4 > 1 > 2$
(b) $2 > 1 > 3 > 4$
(c) $2 > 1 > 4 > 3$
(d) $3 > 4 > 2 > 1$

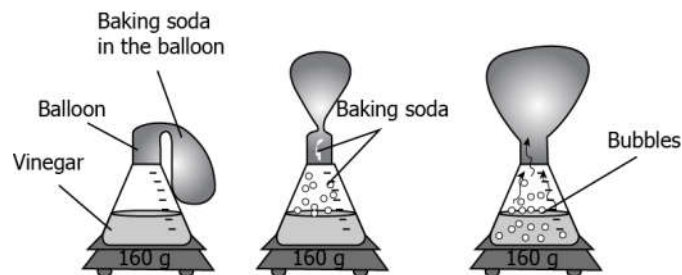
S.No.	Sample	pH value
1.	Lemon juice	2.2
2.	Gastric juice	1.2
3.	Vinegar	3.76
4.	Dil. acetic acid	3.0

2. Which one of the following reactions is categorised as thermal decomposition reaction ?

1

- (a) $2H_2O(l) \rightarrow 2H_2(g) + O_2(g)$ (b) $2AgBr(s) \rightarrow 2Ag(s) + Br_2(g)$
(c) $2AgCl(s) \rightarrow 2Ag(s) + Cl_2(g)$ (d) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

3. A student poured 100 mL of water in a bottle and added 40 mL vinegar to it. A balloon was filled with 20 g baking soda and was fixed at the mouth of the bottle. Slowly the shape of the balloon changed, as shown below.



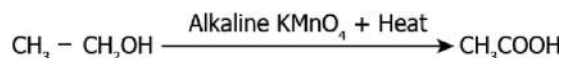
The student claims that a chemical change happened when the two substances were mixed. Is the claim made by the student correct?

1

- (a) Yes, as a new substance was formed in the form of a gas.
(b) Yes, as the mass remains the same throughout the experiment.
(c) No, as the formation of bubbles in the mixture shows a physical change.
(d) No, as the change in the shape and size of the balloon shows a physical change.

4. The reaction represents the conversion of alcohol into acids.

1



Which of these acts an oxidising agent that helped to complete the reaction?

- (a) Heat (b) CH_3COOH (c) CH_3CH_2OH (d) Alkaline $KMnO_4$

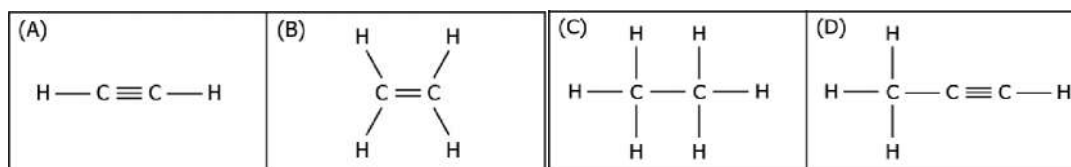
5. Which of the following oxide(s) is/are soluble in water to form alkalis ? 1

- (i) Na_2O (ii) SO_2 (iii) K_2O (iv) NO_2
 (a) (i) and (iii) (b) (i) only (c) (ii) and (iv) (d) (iii) only

6. How will you protect yourself from the heat generated while diluting a concentrated acid? 1

- (a) By adding acid to water with constant stirring.
 (b) By adding water to acid with constant stirring.
 (c) By adding water to acid followed by base.
 (d) By adding base to acid with constant stirring.

7. The image represents the structure of a few hydrocarbon compounds.

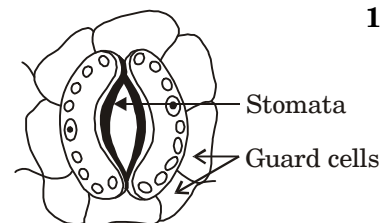


Which of these compounds can be classified as alkynes? 1

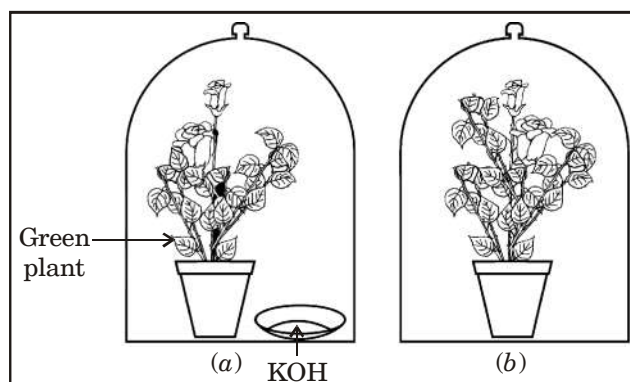
- (a) only (A) (b) only (B) (c) both (A) and (D) (d) both (B) and (C)

8. Which one of the following conditions is true for the state of stomata of a green leaf shown in the given diagram ? 1

- (a) Large amount of water flows into the guard cells.
 (b) Gaseous exchange is occurring in large amount.
 (c) Large amount of water flows from the guard cells.
 (d) Large amount of sugar collects in the guard cells.



9. A student was asked to write a stepwise procedure to demonstrate that carbon dioxide is necessary for photosynthesis. He wrote the following steps. The wrongly worded step is : 1

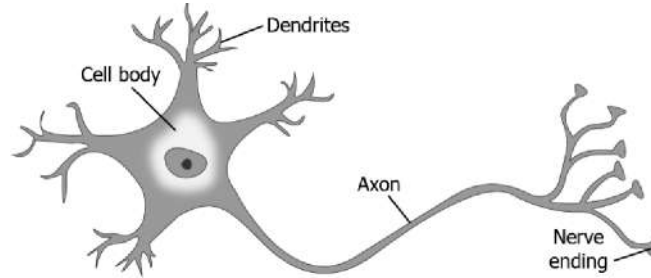


- (a) Both potted plants are kept in dark room for at least three days.
 (b) Bottom of the bell jars is sealed to make them air tight.
 (c) Both potted plants are kept in sunlight after the starch test.
 (d) A leaf from both the plants is taken to test the presence of starch.

10. Humans have two different sex chromosomes, X and Y. Based on the Mendel's laws, a male offspring will inherit which combination of chromosomes? 1

- (a) both the X chromosomes from one of its parents
 (b) both the Y chromosomes from one of its parents
 (c) combination of X chromosomes from either of its parents
 (d) combination of X and Y chromosome from either of its parents

11. The image shows the structure of a neuron.



How will information travel within a neuron?

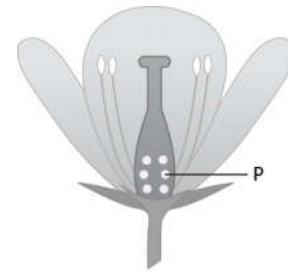
1

- (a) Dendrite → cell body → axon → nerve ending
- (b) Dendrite → axon → cell body → nerve ending
- (c) Axon → dendrite → cell body → nerve ending
- (d) Axon → cell body → dendrite → nerve ending

12. The image shows the structure of a flower.

1

Which process will likely be disturbed or not occur, if labelled part is removed from the flower?



- (a) formation of fruit
- (b) transport of pollen
- (c) formation of pollen
- (d) development of pollen tube

13. If the current I through a resistor is increased by 100% (assume that temperature remains unchanged), the increase in power dissipated will be

1

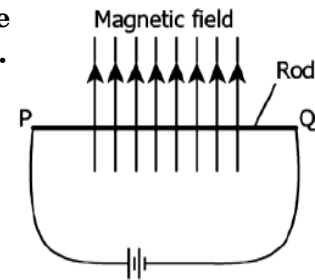
- (a) 100 %
- (b) 200 %
- (c) 300 %
- (d) 400 %

14. A metal rod PQ is placed in the magnetic field. The ends of the rod are connected with a battery using wires.

Where will the rod move?

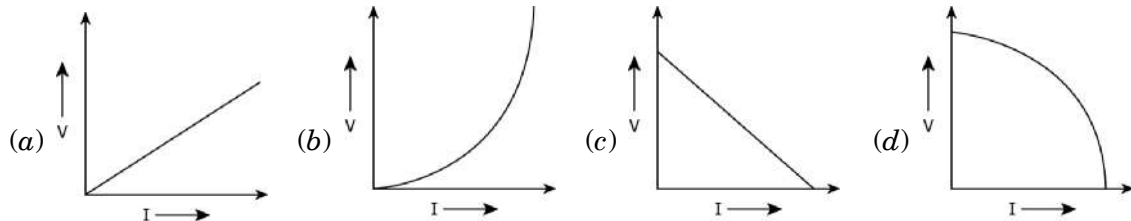
1

- (a) upward
- (b) downwards
- (c) into the field
- (d) out of the field



15. Which plot shows the change in voltage when the current is gradually decreased across a resistor?

1



16. Choose the incorrect statement from the following regarding magnetic lines of field

1

- (a) The direction of magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points
- (b) Magnetic field lines are closed curves
- (c) If magnetic field lines are parallel and equidistant, they represent zero field strength
- (d) Relative strength of magnetic field is shown by the degree of closeness of the field lines

(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is False but R is true
- 17. Assertion :** All decomposition reactions are generally endothermic reactions.
Reason : All decomposition reactions generally occur with the absorption of heat or light energy. 1
- 18. Assertion :** In animals like snails individuals can change sex.
Reason : In animals like snails sex is not genetically determined. 1
- 19. Assertion :** The human heart has four different chambers.
Reason : The different chambers in heart prevent the mixing of oxygenated and deoxygenated blood. 1
- 20. Assertion :** If there is a circular coil having n turns, the field produced is n times as large as that produced by a single turn.
Reason : The current in each circular turn has the same direction, and the field due to each turn then just adds up. 1

SECTION : B

(Q. no. 21 to 26 are very short answer questions.)

- 21. Give reasons for the following :**
 (a) Dry HCl does not change the colour of dry litmus paper.
 (b) Aqueous solution of an acid conducts electricity. 2
- Or**
- (i) Select a metal out of the following which reacts with hot water but not with cold water : Iron, sodium, magnesium.
 (ii) Write the chemical equation of the reaction and name the main product formed during the reaction.
- 22. Different parts of brain are associated with specific functions. Name the part of human brain which perform the following functions :**
 (a) Sensation of feeling full (b) Vomiting
 (c) Picking up a pencil (d) Riding a bicycle 2
- 23. How is the small intestine designed to absorb digested food ?** 2
- 24. Define excretion. Write two vital functions of kidney.** 2
- 25. What is meant by least distance of distinct vision ? Give the value of near point and far point for a normal human eye.** 2

Or

- (a) Mention value for the following :
 (i) Range of vision for normal eye
 (ii) Far point for normal eye
 (iii) Near point for normal eye.
- (b) Answer the following :
 (i) Part of human eye which helps to change focal length of eye lens.
 (ii) The part of human eye where image of an object is formed.
 (iii) The ability of eye lens to adjust its focal length.
- 26. Suggest any two measures to be taken to reduce the damage caused to ozone layer.** 2

SECTION : C**(Q.no. 27 to 33 are short answer questions.)**

27. Take 3 g of barium hydroxide in a test tube, now add about 2 g of ammonium chloride and mix the contents with the help of a glass rod. Now touch the test tube from outside.

(i) What do you feel on touching the test tube ?

(ii) State the inference about the type of reaction occurred.

(iii) Write the balanced chemical equation of the reaction involved. **3**

28. Identify the acid and the base from which sodium chloride is obtained. Which type of salt is it ? When is it called rock salt ? How is rock salt formed ? **3**

29. Write one function of each of the following components of the transport system in human beings : (a) Blood vessels, (b) Lymph, (c) Heart. **3**

Or

What do the following transport ?

(i) Xylem

(ii) Phloem

(iii) Pulmonary vein

(iv) Venacava

(v) Pulmonary artery

(vi) Aorta

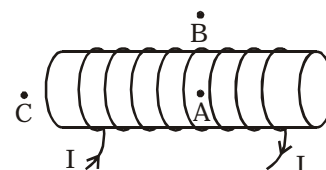
30. Name the type of mirror which is known as shaving mirror. Give relevant ray diagram to justify your answer. **3**

31. Find the refractive index of glass with respect to water where refractive index of glass with respect to air is $n_{ga} = \frac{3}{2}$ and that of water with respect to air is $n_{wa} = \frac{4}{3}$. **3**

32. Describe an activity to show magnetic field lines around a current carrying loop. List the factors on which the field at a point depends. **3**

Or

For the current carrying solenoid as shown below, draw magnetic field lines and giving reason explain that out of the three points A, B and C at which point the field strength is maximum and at which point it is minimum.



33. Why is Government of India imposing a ban on the use of polythene bags ? Suggest two alternatives to these bags and explain how this ban is likely to improve the environment. **3**

SECTION : D**(Q.no. 34 to 36 are Long answer questions.)**

34. Explain the following terms with the help of chemical reaction :

(i) Oxidation reaction

(ii) Substitution reaction

(iii) Esterification reaction

(iv) Saponification reaction

5**Or**

(a) Differentiate between soap and detergent in three points.

(b) Explain why soaps form scum with hard water whereas detergents do not ?

35. Why do human females produce only one type of gamete and males produce two types of gametes ? **5**

Or

Mr. and Mrs. Kashyap had their second baby born just a few days back. The doctor advised them to make use of available contraceptive methods to control further pregnancies.

(a) Which permanent contraceptive method can Mr. Kashyap adopt ?

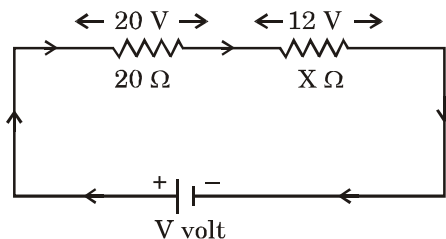
(b) Which contraceptive method changes the hormonal balance of the body so that eggs are not released and fertilisation cannot occur ?

(c) Which method can protect Mrs. Kashyap from sexually transmitted diseases and also prevent pregnancy ?

(d) State the reason behind the doctor's advice to use contraceptive methods. How do you think that the use of contraceptive methods is related to the prosperity of a family? What can a student of your age group do to inspire people to adopt small family norms?

36. (a) With the help of a circuit diagram, deduce the equivalent resistance of two resistances connected in series. 5

(b) Two resistances are connected in series as shown in the diagram.



Calculate : (i) The current through the $20\ \Omega$ resistance.

(ii) Current through X.

(iii) Resistance in X.

SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.)

Internal choice is provided in one of these sub-parts.)

37. Metals occur in nature in the free as well as in the combined state. The less reactive metals are generally found in the free state. Most of the metals however are found in the combined form as minerals. The minerals from which metals can be obtained on a commercial scale are called ores. In other words, the minerals from which metals can be extracted profitably are called ores. Thus, bauxite and clay are minerals of aluminium. However, it is bauxite that is chiefly used to obtain aluminium commercially.

(a) Name two metals which react only with boiling water? 1

(b) Name two metals which are extracted from their oxide ores, by carbon reduction method. 1

(c) What steps will be required to obtain metal from the enriched carbonate ore? Also write the chemical equations for the reactions involved in the process. 2

Or

(d) An ore on treatment with dilute hydrochloric acid produces brisk effervescence. Name the type of ore with one example.

38. Rules for the Inheritance of Traits — Mendel's Contributions

Gregor Johann Mendel was an Austrian Monk who worked on pea plants to understand the concept of heredity. His work laid the foundation of modern genetics. He made three basic laws of inheritance - The Law of Dominance, The Law of Segregation and The Law of Independent Assortment. Sexually reproducing individuals have two copies of genes for the same trait. The traits that express themselves in an organism in every possible combination and can be seen are called dominant traits. A trait which is not expressed in the presence of a dominant allele is known as recessive trait. When only one character is considered while crossing two organisms, then such a cross is known as monohybrid cross. In a monohybrid cross, if a tall plant (TT) is crossed with a dwarf plant (tt), we get 3 tall : 1 dwarf plant at the end of the F_2 progeny. When two characters are considered while crossing two organisms, then such a cross is known as a dihybrid cross. In a dihybrid cross, if a plant with round and green (RRyy) pea seeds is crossed with a plant with wrinkled and yellow (rrYY) pea seeds, then in the first generation all plants will have round and yellow (RrYy) pea seeds. On self-fertilisation the same for F_2 progeny, we will get four combinations of characters in the ratio of 9:3:3:1.

(a) A pure tall plant (TT) of pea was crossed with a dwarf plant (tt). In F_2 progeny, what will be the ratio of pure tall plants to dwarf plants? 1

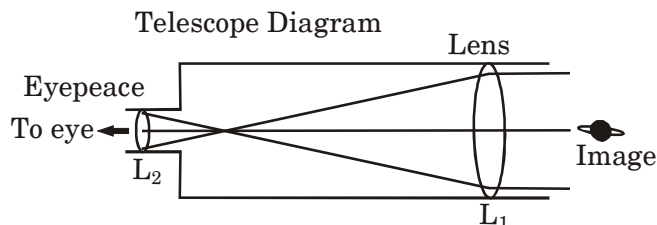
- (b) What is the difference between self fertilization and cross fertilization? 1
 (c) List all the possible genotypes of pea plant with purple flower and round seeds. 2

Or

- (d) What is a gene and how genes control the traits?

39. Himani wanted to see the stars of the night sky. She knows that she needs a telescope to see those distant stars. She finds out that the telescopes, which are made of lenses, are called refracting telescopes and the ones which are made of mirrors are called reflecting telescopes.

So she decided to make a refracting telescope. She bought two lenses, L_1 and L_2 , out of which L_1 was bigger and L_2 was smaller. The larger lens gathers and bends the light, while the smaller lens magnifies the image. Big, thick lenses are more powerful. So to see far away, she needed a big powerful lens. Unfortunately, she realized that a big lens is very heavy.



- (a) What does a telescope do? 1
 (b) If the powers of the lenses L_1 and L_2 are in the ratio of 4 : 1, what would be the ratio of the focal length of L_1 and L_2 ? 1
 (c) How does a refracting telescope work? 2

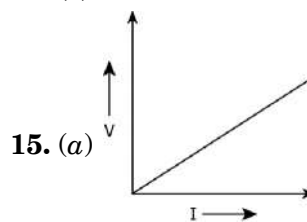
Or

(d) Himani did some preliminary experiment with the lenses and found out that the magnification of the eyepiece (L_2) is 3. If in her experiment with L_2 she found an image at 24 cm from the lens, at what distance did she put the object?

Answers

1. (c) $2 > 1 > 4 > 3$ 2. (d) $\text{CaCO}_3(s) \rightarrow \text{CaO}(s) + \text{CO}_2(g)$
 3. (a) Yes, as a new substance was formed in the form of a gas.
 4. (d) Alkaline KMnO_4 5. (a) (i) and (iii)
 6. (a) By adding acid to water with constant stirring.
 7. (c) both (A) and (D)
 8. (c) Large amount of water flows from the guard cells.
 9. (c) Both potted plants are kept in sunlight after the starch test.
 10. (d) combination of X and Y chromosome from either of its parents
 11. (a) Dendrite \rightarrow cell body \rightarrow axon \rightarrow nerve ending
 12. (a) formation of fruit 13. (c) 300 %

14. (d) out of the field



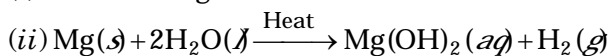
16. (c) If magnetic field lines are parallel and equidistant, they represent zero field strength
 17. (a) Both A and R are true and R is the correct explanation of A
 18. (a) Both A and R are true and R is the correct explanation of A
 19. (a) Both A and R are true and R is the correct explanation of A
 20. (a) Both A and R are true and R is the correct explanation of A

21. (a) In the absence of water HCl cannot ionize to give H⁺ ions. Acidic property like change in colour of litmus depends on production of H⁺ ion, hence there is no colour change.

(b) Acids, when dissolved in water, produce H⁺ ions. The electric current is carried through the solution by these ions.

Or

(i) Metal is magnesium.



Main product is hydrogen.

22. Functions

- (a) Sensation of feeling full
- (b) Vomiting
- (c) Picking up a pencil
- (d) Riding a bicycle

Brain

- Forebrain associated with hunger.
- Medulla in the hind brain.
- Cerebellum of the hind brain.
- Cerebellum of the kind brain

23. • The inner lining of the small intestine has numerous finger-like projections called villi which increase the surface area for absorption of digested food.

• The villi are richly supplied with blood vessels which take the absorbed food and transport to each and every cell of the body.

24. • The biological process involved in the removal of these harmful metabolic wastes from the body is called excretion.

- The nitrogenous wastes such as urea or uric acid are removed from blood in the kidneys.
- Kidney helps to maintain the water balance in the body.

25. The minimum distance, at which objects can be seen most distinctly without strain is called the least distance of distinct vision.

Near point : 25 cm, **Far point** : infinity.

Or

(a) (i) 25 cm to infinity.

(ii) Infinity

(iii) 25 cm

(b) (i) Ciliary muscles

(ii) Retina

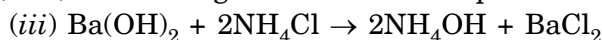
(iii) Power of accommodation.

26. (i) **Reducing emission of chlorofluoro-carbons (CFCs)** : Emission of chlorofluoro-carbons and green house gases like carbon dioxide, methane etc., should be minimised.

(ii) **Afforestation** : Plantation of more and more trees will help to increase oxygen in the environment which will help in the formation of ozone layer.

27. (i) On touching the test tube, coldness is felt.

(ii) It means that the reaction is endothermic. In this reaction, two different atoms or groups of atoms (ions) are exchanged. It is a double displacement reaction.



28. • Rock salt (NaCl) : $\frac{\text{Acid}}{\text{HCl}}, \frac{\text{Base}}{\text{NaOH}}$

- Neutral salt
- When it forms brown crystals combined with impurities then it is called rock salt.
- Rock salt is formed by drying up of seas.

29. (a) Blood vessels transport blood to and fro from heart and different body parts.

(b) Lymph drains excess fluid from extra cellular spaces back into the blood.

(c) Heart pumps the blood to ensure its flow through the blood vessels.

Or

(i) Water and minerals.

(ii) Food prepared in the leaves.

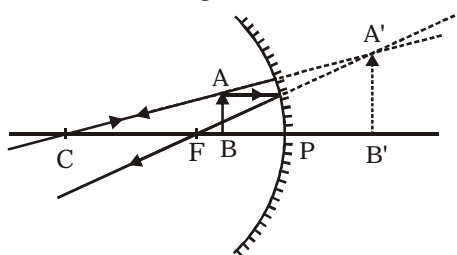
(iii) Oxygenated blood from lungs to heart.

(iv) Deoxygenated blood from cells and tissues of body to heart.

(v) Deoxygenated blood from heart to lungs.

(vi) Oxygenated blood from heart to different body parts/organs.

30. Concave mirrors are used as shaving mirrors because it magnifies the image.



31. Refractive index of glass with respect to air

$$n_{ga} = \frac{\text{Refractive index of glass}}{\text{Refractive index of air}}$$

Refractive index of water with respect to air

$$n_{wa} = \frac{\text{Refractive index of water}}{\text{Refractive index of air}}$$

$$n_{gw} = \frac{\text{Refractive index of glass}}{\text{Refractive index of water}} = \frac{3}{2} \times \frac{3}{4} = \frac{9}{8}.$$

32. Activity : • Take a rectangular cardboard having two holes. Insert a circular coil having large number of turns through them, normal to the plane of the cardboard.

- Connect the ends of the coil in series with a battery and a key.
- Sprinkle iron filings uniformly on the cardboard.
- Plug the key.
- Tap the cardboard gently a few times.

Observation : The circular magnetic field lines near the current carrying loop are observed.

Factors : • Number of turns. • Current in the coil. • Distance at which field is determined.

Or

The magnetic field strength is maximum at point A and is minimum at point C because magnetic field is strong when magnetic field lines are crowded and is weak where magnetic field lines are far apart.

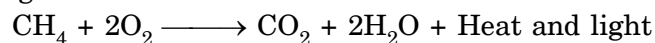
33. Government of India is imposing ban on plastic bags because they are non-biodegradable resources and hence cause environmental pollution.

'Paper bags' and 'cloth bags' can be used in place of plastic bags.

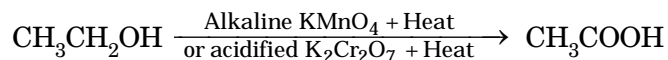
The ban will improve the environment in the following ways :

- (1) By preventing land and water pollution.
- (2) By minimising the production of polythenes, which help in reduction in emission of harmful gases from factories.

34. (i) Oxidation reaction : Hydrocarbons burn in excess of oxygen to form CO_2 , H_2O and produce lots of heat and light.



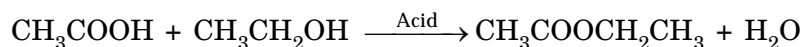
In addition of this complete oxidation, in some other reactions alcohols are converted to carboxylic acids.



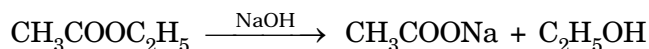
(ii) Substitution reactions : These are the reactions in which some atoms such as chlorine replace hydrogen atoms from saturated hydrocarbons one by one in the presence of sunlight. A number of products are usually formed with the higher homologues of alkanes.



(iii) **Esterification reactions** : The reactions in which alcohols react with carboxylic acid in presence of an acid to form sweet smelling product, called esters are called esterification reactions.



(iv) **Saponification reaction** : On treating with sodium hydroxide, which is an alkali, the ester is converted back to alcohol and sodium salt of carboxylic acid. This reaction is called saponification because it is used in the preparation of soap.



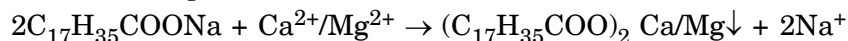
Or

(a)

S.No.	Soap	Detergent
1.	Soaps are sodium or potassium salts of long chain carboxylic acids.	Detergents are ammonium or sulphonate salts of long chain carboxylic acids.
2.	Soaps form an insoluble substance called scum with hard water.	Detergents do not form scum with hard water.
3.	Do not cause water pollution.	Cause water pollution.
4.	Weak cleansing action.	Strong cleansing action.

(b) Soaps are sodium or potassium salts of higher fatty acids. These form insoluble mass (precipitate) with calcium or magnesium ions present in hard water.

Soap + Hard water → Insoluble mass or scum



But detergents are ammonium or sulphonate salts of long chain carboxylic acids do not form insoluble precipitates with the Ca^{2+} or Mg^{2+} ions in hard water.

35. • The gametes are formed by meiosis cell division.

- In human females only one female gamete (egg) is formed.
- Both the sex chromosomes of female gamete are similar. *i.e.* 22 + X type having half set (haploid) chromosomes.
- In human males the number of male gametes formed by meiosis division is 4, having haploid chromosomes.
- 50% of all male gametes have 22 + X and other 50% have 22 + Y type of chromosomes.
- Therefore, males have two types of gametes. The first one having 22 + X chromosomes when fuses with female gamete produces 44 + XX (female child), while the other having 22 + Y chromosomes, if fuses with female gamete produces 44 + XY (male child).

Or

(a) Vasectomy (Blocking vas deferens by surgery.)

(b) Use of contraceptive pills.

(c) Use of condoms during sex.

(d) • Doctor advised so to keep reasonable time gap between two children.

- (i) It reduces the expenditure so that the child could be properly brought up.
- (ii) It reduces the size of the family that helps in focussing on the growth and development of the baby.
- (iii) They will enjoy their lives happily.
- (i) Small family, happy family.
- (ii) Better attention, better care, better future.
- (iii) Less burden, more prosperity.

36. (a) Let the potential difference across the resistors R_1 , R_2 and R_3 are V_1 , V_2 and V_3 respectively. In the electric circuit shown, let I be the current through the circuit. In this case, the current through each resistor is also I and the potential difference V across a combination of resistors is equal to the sum of potential differences across the individual resistors. That is

$$V = V_1 + V_2 + V_3 \quad \dots(1)$$

If the resistors R_1 , R_2 and R_3 are replaced by an equivalent single resistor R , such that the potential difference V across it, and current I through the circuit remains the same, then, applying the Ohm's law to the entire circuit and three resistors separately, we have :

$$V = IR ; \quad V_1 = IR_1$$

$$V_2 = IR_2 ; \quad V_3 = IR_3$$

From eqn. (1), $IR = IR_1 + IR_2 + IR_3$

or $R = R_1 + R_2 + R_3$

(b) (i) $R = 20 \Omega ; \quad V = 20 V$

Total current, $I = ?$

$$V = IR$$

$$20 = I \times 20$$

$$\boxed{I = 1 A}$$

(ii) Current is same in series combination i.e., 1 A.

(iii) $V = 12 V ; \quad R = 'X' \Omega ; \quad I = 1 A.$

So, $V = 1 \times R$

$$12 = 1 \times X$$

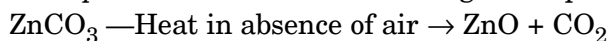
$$\boxed{X = 12 \Omega}$$

37. (a) Magnesium (Mg) and Aluminium (Al)

(b) Zinc (Zn) and Tin (Sn)

(c) Calcination is the process of heating the ore strongly in the absence or limited supply of air.

Example: Zinc carbonate on heating decomposes to form zinc oxide and carbon dioxide.



Or

(d) The ore on treatment with dilute HCl produces brisk effervescence must be a carbonate ore.

Calamine (ZnCO_3) is an important carbonate ore of zinc.

38. (a) 1:1

(b) **Self fertilization** : It involves the fusion of male and female gametes of the same parent. Therefore it is uni-parental.

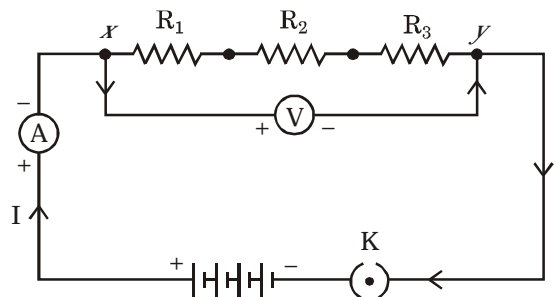
Cross fertilization : It involves the fusion of two gametes produced by different parents. Therefore it is bi-parental.

(c) Four genotypes are possible (i) PPRR (ii) PPRr (iii) PpRR (iv) PpRr.

Or

(d) Gene is a section of DNA that provides information for the protein which controls the characteristics or traits.

If the gene for an enzyme has an alteration that makes the enzyme less efficient, the amount of hormone will be less and so the less production of protein which is responsible for that particular trait.



39. (a) A telescope is used to observe objects in the sky. Because these objects are very far away, they usually appear to be rather small and are often very faint. The telescope makes the objects appear brighter and, except for stars, also makes the objects appear larger.

$$\begin{aligned}
 (b) \quad 1 : 4 \quad (\text{Optional}) : \quad P &= \frac{1}{f} \\
 \Rightarrow \quad \frac{P_1}{P_2} &= \frac{f_2}{f_1} \\
 \Rightarrow \quad \frac{4}{1} = \frac{f_2}{f_1} &\Rightarrow \frac{f_1}{\frac{1}{4}} \Rightarrow f_1 : f_2 = 1 : 4
 \end{aligned}$$

(c) The telescope contains an objective, a large lens that acts as a big light funnel, collecting light and bringing it to a focus. The telescope also contains an eyepiece, a small lens that acts as a magnifying glass to enlarge the image created by the objective.

Or

$$\begin{aligned}
 (d) \quad \text{Magnification of lens (M)} &= \frac{v}{u} \\
 \Rightarrow \quad 3 &= \frac{24}{u} \\
 \Rightarrow \quad 3u &= 24 \\
 \Rightarrow \quad u &= \frac{24}{3} \Rightarrow u = 8 \text{ cm}
 \end{aligned}$$

Therefore the object is placed at a distance of 8 cm in front of the eyepiece.



SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

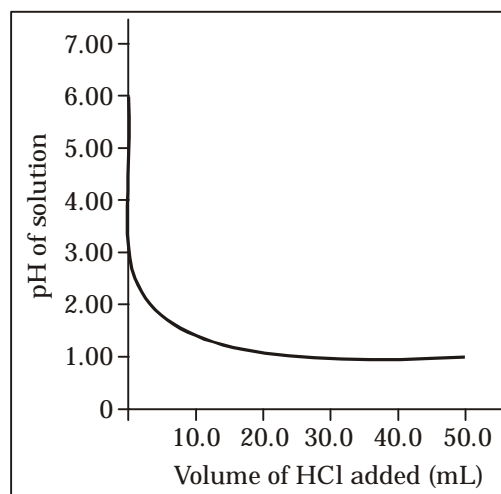
Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

SECTION : A

(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. 50.0 mL of tap water was taken in a beaker. Hydrochloric acid was added drop by drop to water. The temperature and pH of the solution was noted. The following graph was obtained. Choose the correct statements related to this activity.



(i) The process of dissolving an acid in water is highly endothermic.

(ii) The pH of the solution increases rapidly on addition of acid.

(iii) The pH of the solution decreases rapidly on addition of acid.

(iv) The pH of tap water was around 7.0.

- (a) (i) and (ii) (b) (i) and (iii)
(c) (iii) and (iv) (d) (ii) and (iv) 1

2. The chemical reaction between copper and oxygen can be categorized as : 1

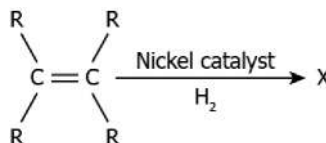
- (a) Displacement reaction (b) Decomposition reaction
(c) Combination reaction (d) Double displacement reaction

3. Which of the following statements about the reaction given below are correct ?

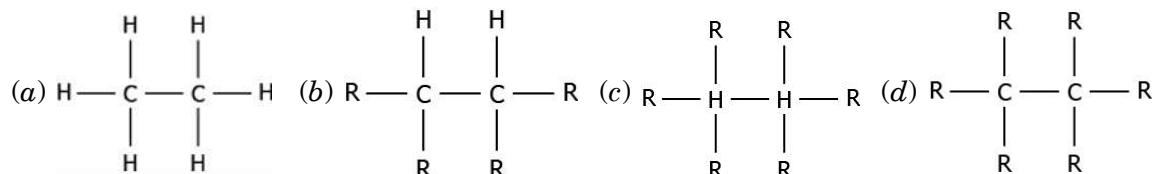


- (i) HCl is oxidized to Cl_2 (ii) MnO_2 is reduced to MnCl_2
(iii) MnCl_2 acts as an oxidizing agent (iv) HCl acts as an oxidizing agent 1
(a) (ii), (iii) and (iv) (b) (i), (ii) and (iii) (c) (i) and (ii) only (d) (iii) and (iv) only

4. The image represents the chemical reaction of an unsaturated hydrocarbon in the presence of nickel. 1



Which option represents the product "X" ?



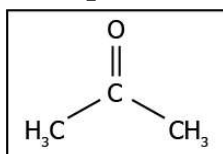
5. A student adds some metallic ash in water taken in a test tube. The ash gets completely dissolved in water and the solution changes colour. What should the student do next to test the chemical properties of the product formed? 1

- (a) Evaporate the solution to get crystals.
 (b) Test the basicity using a red litmus paper.
 (c) Test the acidity using a blue litmus paper.
 (d) Measure the temperature change using a thermometer.

6. Which option shows a balance equation of the formation of sodium hydroxide? 1

- (a) $\text{Na}_2\text{Cl} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + 2\text{HCl}$ (b) $2\text{NaCl} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + 2\text{HCl}$
 (c) $\text{NaCl} + 2\text{H}_2\text{O} \rightarrow \text{NaOH} + \text{Cl}_2 + \text{H}_2$ (d) $2\text{NaCl} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{Cl}_2 + \text{H}_2$ 1

7. The image represents a carbon compound.

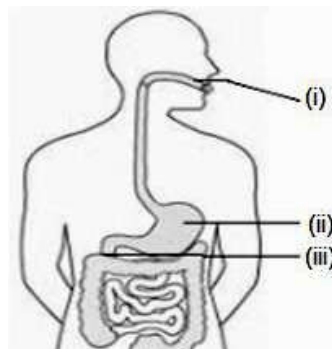


Which functional group is present in the compound? 1

- (a) alcohol (b) aldehyde (c) carboxylic acid (d) ketone

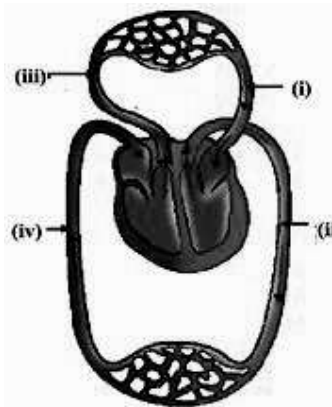
8. Identify the option that indicates the correct enzyme that is secreted in location (i), (ii) and (iii). 1

- (a) (i)-lipase, (ii)-trypsin, (iii)-pepsin
 (b) (i)-amylase, (ii)-pepsin, (iii)-trypsin
 (c) (i)-trypsin, (ii)-amylase, (iii)-carboxylase
 (d) (i)-permease, (ii)-carboxylase, (iii)-oxidase

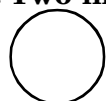


9. The figure given below shows a schematic plan of blood circulation in humans with labels (i) to (iv). Identify the correct label with its functions? 1

- (a) (i) Pulmonary vein — takes impure blood from body part.
 (b) (ii) Pulmonary artery — takes blood from lung to heart.
 (c) (iii) Aorta — takes blood from heart to body parts.
 (d) (iv) Vena cava — takes blood from body parts to right auricle.



10. Two individuals are as shown using geometric shapes. 1



X^fY



X^mX^m

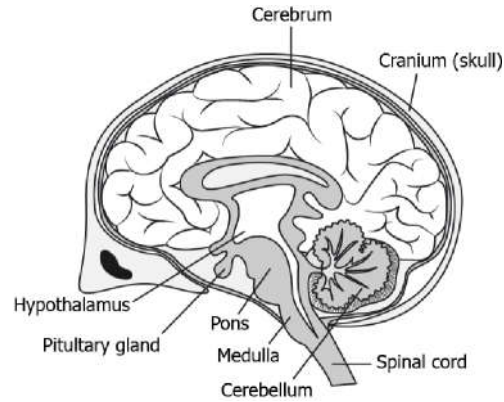
Their sex chromosomes are respectively denoted by X^fX^m , and Y. What are the possible combinations of sex chromosomes for their male and female offspring respectively?

- (a) X^fX^m and X^mX^m (b) X^mY and X^mX^m (c) X^fY and X^mY (d) X^mY and X^mX^f

11. The image shows the labelled structure of a brain.

Which parts of the brain controls the blood pressure?

- (a) spinal cord, skull, hypothalamus
- (b) cord, skull, cerebrum
- (c) Pons, medulla, cerebellum
- (d) pons, medulla, pituitary



1

12. The table shows the changes that occur in girls during puberty.

A. Increase in the size of the breasts
B. Beginning of menstruation
C. Darkening of skin around the nipples

What is the likely significance of these changes?

- (a) aging of the body
- (b) sexual maturation
- (c) production of germ cells
- (d) abnormal division of the cells

1

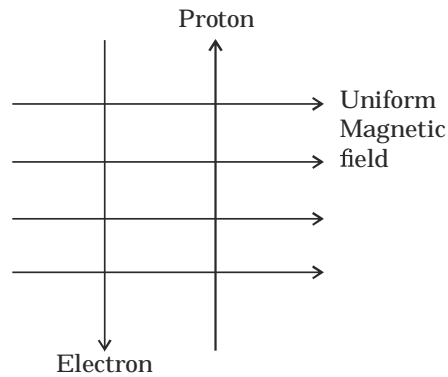
13. In an electrical circuit three incandescent bulbs A, B and C of rating 40 W, 60 W and 100 W respectively are connected in parallel to an electric source. Which of the following is likely to happen regarding their brightness?

- (a) Brightness of all the bulbs will be the same
- (b) Brightness of bulb A will be the maximum
- (c) Brightness of bulb B will be more than that of A
- (d) Brightness of bulb C will be less than that of B

1

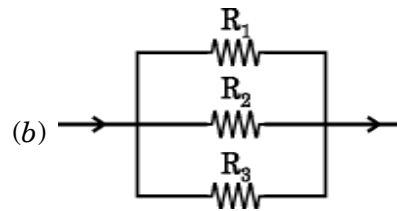
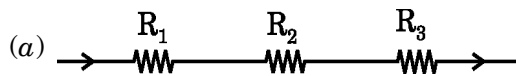
14. A uniform magnetic field exists in the plane of paper pointing from left to right as shown in Figure. In the field an electron and a proton move as shown. The electron and the proton experience

- (a) forces both pointing into the plane of paper
- (b) forces both pointing out of the plane of paper
- (c) forces pointing into the plane of paper and out of the plane of paper, respectively
- (d) force pointing opposite and along the direction of the uniform magnetic field respectively

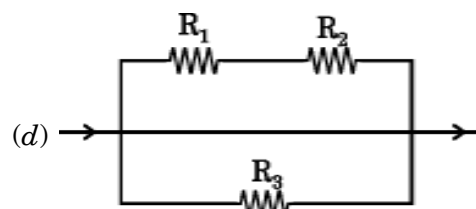
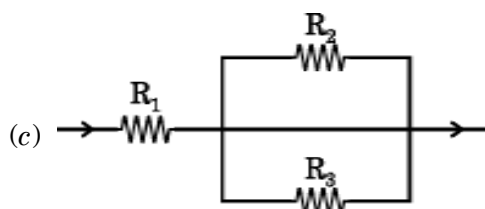


1

15. Choose the correct parallel arrangement of three resistors to determine equivalent resistance.



1



16. Appliances that have metal body are generally connected to the earthing wire. What is the reason to earth these wires? 1

- (a) to prevent excess of current (b) to prevent the leakage of current
 (c) to provide extra current to appliance (d) to provide high resistance to the appliance

(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is False but R is true

17. Assertion : $\text{Fe}(s) + \text{CuSO}_4(aq) \longrightarrow \text{FeSO}_4(aq) + \text{Cu}(s)$ is a double displacement reaction.

Reason : Two types of products are formed. 1

18. Assertion : In humans, the genes inherited from parents don't decide the sex of the offspring.

Reason : The inheritance of X chromosome from father will result into a female offspring and of Y chromosome will result into a male. 1

19. Assertion : The atrias and ventricles are devoid of valves.

Reason : The valves prevent the back-ward flow of blood when atria or ventricles contract. 1

20. Assertion : A compass needle may or may not get deflected when brought near a bar magnet.

Reason : The ends of the compass needle point approximately towards north and south directions. 1

SECTION : B

(Q. no. 21 to 26 are very short answer questions.)

21. State what happens when zinc granules are heated with sodium hydroxide solution. Write the balanced equation for this reaction. Name the main product formed in this reaction. 2

Or

An element reacts with air (oxygen) to form its oxide. When dissolved in water the solution turns red litmus blue. Is it a metal or a non-metal ? Justify your answer.

22. How is our brain double-protected against injuries and shocks ? 2

23. How do autotrophs obtain food ? Explain the process with the help of a balanced chemical equation. 2

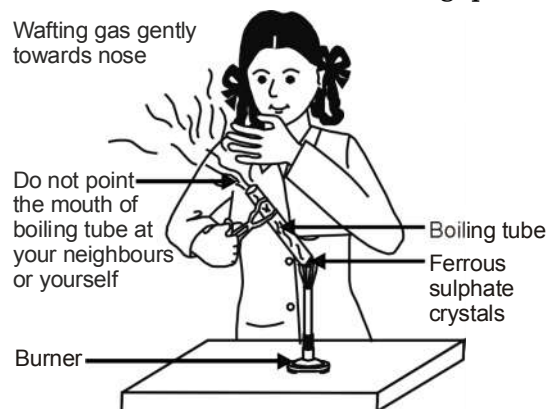
24. Name one nitrogenous waste present in urine. What is the basic filtration unit of kidney called? How is the amount of urine produced regulated? 2

25. A person cannot see objects beyond 1.2 m distinctly. Giving reason name the defect of vision and name the nature of corrective lens. 2

Or

What is presbyopia ? State its cause.

26. Name the gas present in atmosphere that prevents UV radiations to reach earth. How are UV radiations harmful to living beings ? 2

SECTION : C**(Q.no. 27 to 33 are short answer questions.)****27.** Look at the figure given below and answer the following questions :

- (i) What is the colour of ferrous sulphate crystals before and after heating ?
 (ii) How do you identify the gases evolved on heating ?
 (iii) Write the balanced chemical equation. What kind of reaction does it represent ? **3**

28. (a) Define the term pH of a solution. The pH of gastric juices of the sample collected from the stomach of two persons A and B were found to be 1 and 3 respectively. The gastric juice of which person is more acidic ?

(b) Name one salt whose solution has pH more than 7 and one salt whose solution has pH less than 7. **3**

29. Define transpiration. State the significance of flattened structure of leaf. **3**

Or

Draw a diagram to show internal structure of human heart. Label six parts in all including at least three valves.

30. Draw the ray diagram to show reflected ray by a convex mirror when the incident ray is

- (a) parallel to the principal axis to the mirror.
 (b) incident towards centre of curvature of convex mirror.
 (c) incident at an angle at the pole of the convex mirror. **3**

31. State the laws of refraction of light. Explain the term 'absolute refractive index of a medium' and write an expression to relate it with the speed of light in vacuum. **3**

32. What is an electromagnet ? How can we determine north and south pole of an electromagnet with the help of magnetised iron bar ? **3**

Or

Compare the magnetic lines of force for solenoid and a bar magnet and state one similarity.

33. How is ozone both beneficial and damaging ? How can we prevent the damaging effect of ozone ? **3**

SECTION : D**(Q.no. 34 to 36 are Long answer questions.)**

34. What are esters ? Mention any two uses of them. Distinguish between esterification and saponification processes giving the relevant chemical equations. **5**

Or

(a) Explain why carbon forms covalent bond? Give two reasons for carbon forming a large number of compounds.

(b) Explain the formation of ammonia molecule.

35. Draw the male reproductive parts of a flower and label them. What is it called ? **5**

Or

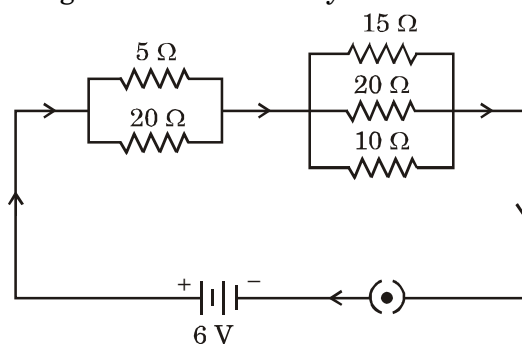
(i) Name the following :

- Part of the female reproductive system that receives sperms.
- Hormone produced by the testes.
- Disc like structure that transports nutrition from mother to the foetus.
- Tube that carries the egg from the ovary to the womb.
- Site of location of testes.

(ii) Explain the role of oviduct and placenta in female reproductive system.

36. (a) What is meant by the series combination and parallel combination of resistances ?

(b) In the circuit diagram given below five resistances of $5\ \Omega$, $20\ \Omega$, $15\ \Omega$, $20\ \Omega$ and $10\ \Omega$ are connected as given in figure to a $6\ \text{V}$ battery.



Calculate :

- Total resistance in the circuit.
- Total current flowing in the circuit.

5

SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.

Internal choice is provided in one of these sub-parts.)

37. The arrangement of metals in a vertical column in the decreasing order of their re-activities is called the reactivity series or activity series of metals. The most reactive metal is at the top position of the reactivity series. The least reactive metal is at the bottom of the reactivity series.

Hydrogen, though a non-metal, has been included in the activity series of metal only for comparison. Apart from it, the hydrogen atom also has tendency to lose its valence electron and form cation like the behaviour shown by metals. Thus, $\text{H} \longrightarrow \text{H}^+ + e^-$

Sometimes another non-metal carbon is also used in the reactivity series between aluminium and zinc as it is used to extract metals from their oxides.

(a) Copper occupies lower place in reactivity series of metals. Name a metal which can be displaced by copper from its salt solution? **1**

(b) Hydrogen, though a non-metal, but has been included in the activity series of metal. Why? **1**

(c) Aluminium is highly reactive metal but is still used for packaging food materials. Give reason. **2**

Or

(d) Why sodium is stored in kerosene oil? Name another metal which is also stored in mineral oil like kerosene.

38. The thyroid is a small, butterfly-shaped located at the base of your neck. The thyroid gland is an endocrine gland. It manufactures hormones that regulate our body's metabolism. Four common disorders of the thyroid are hashimoto's disease, grave's disease, goitre and thyroid nodules.

In hyperthyroidism, the thyroid gland is overactive 'Graves' disease is the most common cause of hyperthyroidism affecting about 70 percent of people. Nodules on the thyroid can also cause the gland to over produce its hormones.

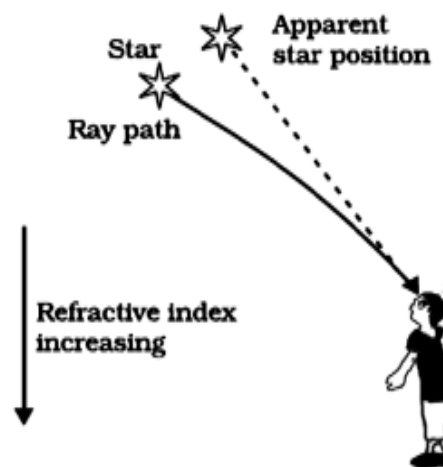
Excessive thyroid hormone production leads to symptoms such as: restlessness, nervousness, racing heart, irritability increased sweating, shaking, anxiety, thin skin, brittle hair and nails, weight loss, bulging eyes, muscle weakness.

- (a) What is thyroid gland? Where is it located in our body? 1
 (b) What is the function of the thyroid gland? 1
 (c) Name some common disorders of the thyroid. 2

Or

(d) Give four symptoms of hyperthyroidism.

39. The twinkling of a star is due to atmospheric refraction of starlight. The starlight on entering the earth's atmosphere undergoes refraction continuously before it reaches the earth. The atmospheric refraction occurs in a medium of gradually changing refractive index. Since the atmosphere bends starlight towards the normal, the apparent position of the star is slightly different from its actual position. The star appears slightly higher than its actual position when viewed near the horizon. Further this apparent position of the star is not stationary, but keeps on changing slightly, since the physical conditions of the earth's atmosphere are not stationary. Since the stars are very distant they are approximate point-sized source of light. As the path of rays of light coming from the star goes on varying slightly, the apparent position of the star fluctuates and the amount of starlight entering the eye flickers the stars sometimes appear brighter and at some other time, fainter, which is the twinkling effect.



- (a) Why the Sun appears white, when it is overhead at noon? 1
 (b) How does the propagation of light of different colours of white light take place in air? 1
 (c) How are the rainbows formed? Name the phenomenon involved in the formation of rainbow. 2

Or

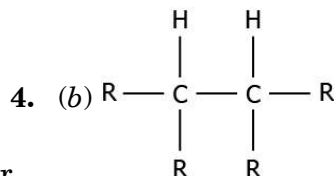
(d) Why do the stars seem higher than they actually are?

Answers

1. (c) (iii) and (iv)

2. (c) Combination reaction

3. (c) (i) and (ii) only



5. (b) Test the basicity using a red litmus paper.

6. (d) $2\text{NaCl} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{Cl}_2 + \text{H}_2$

7. (d) ketone

8. (b) (i)-amylase, (ii)-pepsin, (iii)-trypsin

9. (d) (iv) Vena cava — takes blood from body parts to right auricle.

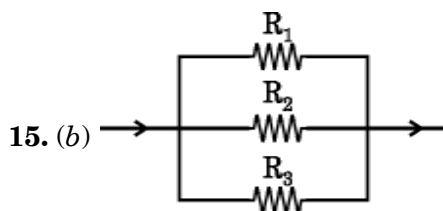
10. (d) X^mY and X^mX^f

11. (c) Pons, medulla, cerebellum

12. (b) sexual maturation

13. (c) Brightness of bulb B will be more than that of A

14. (a) forces both pointing into the plane of paper



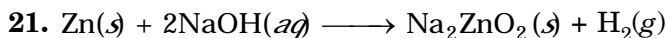
16. (b) to prevent the leakage of current

17. (d) A is False but R is true

18. (d) A is False but R is true

19. (d) A is False but R is true

20. (d) A is False but R is true



Main products formed are sodium zincate and hydrogen gas.

Or

Basic oxide turns red litmus blue so it is a metallic oxide. It is metal.

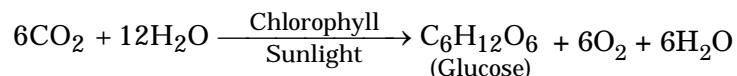


22. • The brain is located inside a bony box.

• Inside the box, the brain is contained in a fluid-filled balloon which provides further shock absorption.

23. • The autotrophs obtain the raw material in the form of water from soil and carbon dioxide from atmosphere which is converted into carbohydrates in the presence of sunlight and chlorophyll.

• They synthesize their food in the presence of sunlight by the process of photosynthesis.



24. • Urea and uric acid.

• The basic filtration unit of kidney is called nephron.

• The amount of urine formation depends how much excess water is there in the body and how much of dissolved wastes is to be excreted.

25. The person who cannot see object beyond 1.2 m from eye is suffering from myopia. In myopic eye, the image of a distant object is formed in front of the retina and not at the retina itself. This defect of vision is corrected by using a concave lens of proper focal length.

Or

• Presbyopia is the defect in which the power of accommodation of the eye usually decreases with ageing. Eye lens cannot focus the image at retina for nearby and far object.

• It arises due to the gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens.

26. • Ozone gas.

• Harmful effects of U.V. radiation :

(i) It increases the incidents of skin cancer.

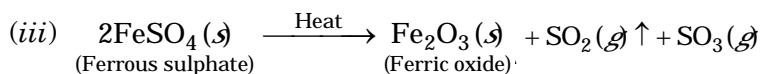
(ii) It causes damage to eyes by increasing incidents of cataract in eyes.

(iii) It may cause damage to immune system.

(Any two points)

27. (i) Before heating the crystals are green in colour. After heating they turn white.

(ii) The gas evolved can be identified by the characteristic smell of burning sulphur.



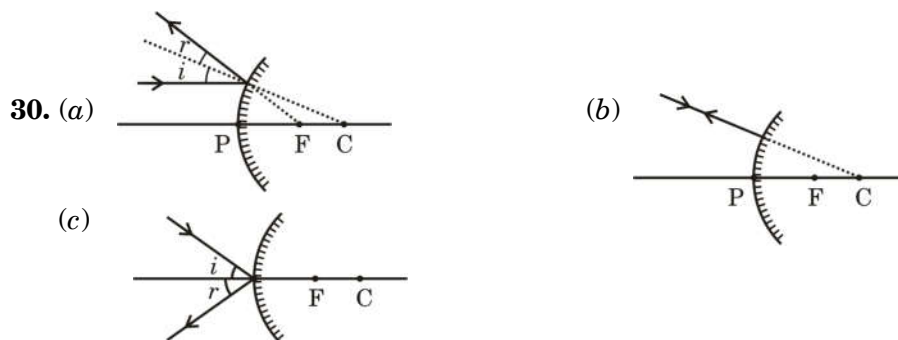
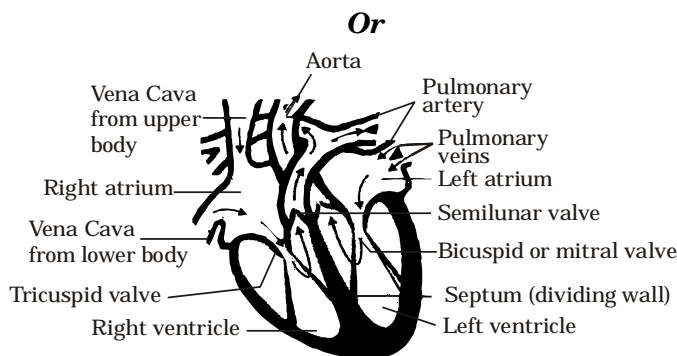
It is a decomposition reaction.

28. (a) pH is a scale for measuring hydrogen ion concentration in a solution. It can measure generally from 0 (very acidic) to 14 (very alkaline). Higher the hydronium ion concentration, lower is the pH value. So gastric juice of person 'A' is more acidic than 'B' which has pH value 3.

(b) Sodium acetate (CH_3COONa) has pH more than 7 and ammonium nitrate (NH_4NO_3) has pH less than 7.

29. Transpiration : It is the loss of water in the form of water vapours from the surface of leaf.

Significance : Leaf is the main photosynthetic organ of the plant. The flattened structure of leaf ensures a large surface area for absorption of light and exchange of gases for photosynthesis.



31. • Laws of refraction of light :

(i) The incident ray, refracted ray and normal to interface of two media, all lie in the same plane.

(ii) The ratio of sine of angle of incidence to sine of angle of refraction is constant.

$$\frac{\sin i}{\sin r} = \text{Constant.}$$

• Absolute refractive index compares the optical density of a medium with that of air. It is the ratio of speed of light in air to the given medium.

$$\text{Absolute refractive index} = \frac{\text{Speed of light in air}}{\text{Speed of light in vacuum}}$$

32. Electromagnet : When a soft iron is placed inside a solenoid and current is passed through it then the soft iron gets magnetised. The magnet so formed is called an electromagnet.

The north and south pole of an electromagnet can be determined by magnetised iron bar. A magnetised iron bar behaves like a magnet. Suspend it freely with a thread such that the thread is neatly wound around its centre. The north pole of magnet is in the direction of north pole of earth and south pole of magnet at the south pole of earth.

Or

The pattern of the magnetic field lines around a current carrying solenoid is same as the magnetic field around a bar magnet. In fact, one end of the solenoid behaves as a magnetic north pole while the other behaves as the south pole just like a bar magnet. The magnetic field inside a solenoid is uniform. This indicates that the magnetic field is the same at all points inside the solenoid.

33. Beneficial factors of ozone : Ozone (O_3) forms a protective layer around our atmosphere and protects the earth from harmful ultraviolet (UV) radiations of the sun.

Ozone is also damaging. It is a deadly poison. When pollutants released from the vehicles rise above, they collide with the ozone layer and mix with UV radiations. At this stage ozone becomes damaging and it can cause many forms of respiratory and circulatory disorder in living organisms.

Steps to prevent damaging effects of ozone :

- (i) Reduce the use of private vehicles.
- (ii) Use of automobile reagents that prevents the production of harmful gases and chemicals.
- (iii) Reduce the use of aerosols and pesticides sprays.

34. • Esters are sweet-smelling substances formed by the reaction of an acid and alcohol in the presence of an acid which acts as catalyst. It has functional group — COO —

- (a) Esters are used in making perfumes, and (b) used as flavouring agents.

Esterification	Saponification
<ul style="list-style-type: none"> • The process of formation of an ester by the reaction of carboxylic acid and an alcohol in presence of concentrated sulphuric acid is called esterification. $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH} + \text{H}-\text{OCH}_2\text{CH}_3 \xrightarrow[\text{H}_2\text{SO}_4]{\text{Conc.}} \text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{OCH}_2\text{CH}_3 + \text{H}_2\text{O}$ <p style="text-align: center;">Ethanoic acid Ethanol Ethyl ethanoate</p>	<ul style="list-style-type: none"> • Esters react in presence of acid/base to give back alcohol and carboxylic acid. This reaction is known as saponification. $\text{CH}_3\text{COOC}_2\text{H}_5 \xrightarrow{\text{NaOH}} \text{C}_2\text{H}_5\text{OH} + \text{CH}_3\text{COOH}$ <p style="text-align: center;">Ethyl ethanoate Ethanol Carboxylic acid</p>

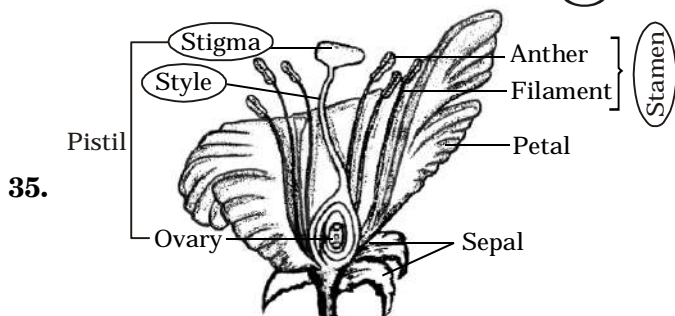
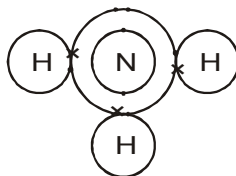
Or

(a) Carbon has the unique property of catenation due to which it forms a large number of compounds. Carbon atoms may be linked by single, double or triple bonds.

Carbon has small size which enables the nucleus to hold on to the shared pairs of electrons strongly. These bonds thus formed are strong making the compounds exceptionally stable.

(b) Formation of NH_3 molecule : N – 2, 5 H – 1

Three hydrogen atoms each share their 1 electron with nitrogen to form three covalent bonds and make an ammonia molecule.



Stamen : It is the male reproductive organ of flower which consists of anther and filament. The pollen grains (male gametes) are formed in the anther.

Stigma : It is the part of female reproductive organ (pistil) where the pollen grains are landed after pollination.

Style : It is the long filamentous tubule which acts as a path for pollen tube after pollination to reach ovary.

Or

- (i) (a) Vagina (b) Testosterone (c) Placenta
 (d) Fallopian tube (e) Outside the abdominal cavity.

(ii) **Oviduct** : It provides a passage for transfer of egg produced from ovary to reach the uterus.

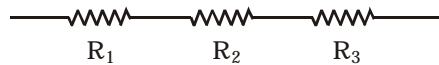
- It is the site of fertilisation of egg.
- It provides the appropriate environment for fertilisation of egg.

Placenta : • It plays an important role to provide nutrients, water, oxygen, minerals and vitamins etc. from the maternal blood to the foetus.

- It helps to give off wastes, carbon dioxide and urea etc. produced by foetus to the maternal blood.

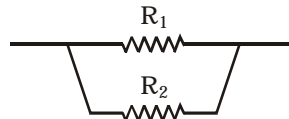
- It also produces some hormones which are essential for healthy development of the embryo.

36. (a) Series combination : When two or more resistances are connected in series, the net resistance in series $R_S = R_1 + R_2 + R_3$



Parallel combination : When two or more resistances are connected in parallel, the net resistance in parallel

$$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$$



(b) (i) Resistances R_1 and R_2 are in parallel

$$\frac{1}{R_{P_1}} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{5} + \frac{1}{20} = \frac{5}{20} \Omega$$

$$R_{P_1} = 4 \Omega$$

Resistances R_3 , R_4 and R_5 are in parallel.

So, net resistance

$$\frac{1}{R_{P_2}} = \frac{1}{15} + \frac{1}{20} + \frac{1}{10} = \frac{13}{60} \Omega$$

$$R_{P_2} = \frac{60}{13} \Omega$$

R_{P_1} and R_{P_2} are in series combination.

$$R_S = 4 + \frac{60}{13}$$

$$R_S = \frac{52 + 60}{13} = \frac{112}{13} \Omega$$

(ii) Potential difference, $V = 6 \text{ V}$

Total current, $I = ?$

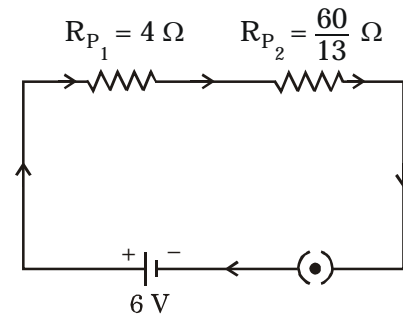
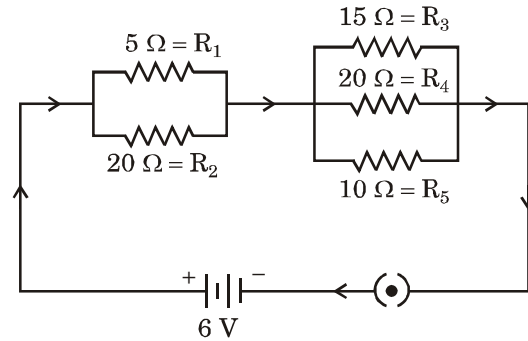
$$\text{Total resistance, } R = \frac{112}{13} \Omega$$

From Ohm's law,

$$V = IR$$

$$6 = I \times \frac{112}{13}$$

$$I = \frac{6 \times 13}{112} = 0.69 \text{ A.}$$



37. (a) Copper can displace silver from its salt solution AgNO_3 because copper is more reactive than silver.

(b) Hydrogen is kept in the reactivity series of metals because like metals it also loses its electron and forms positive ion i.e. H^+ ion.

(c) When Aluminium is exposed to moist air, its surface is covered with a thin protective layer of aluminium oxide (Al_2O_3). After the formation of this protective layer of Al_2O_3 , it becomes resistant to corrosion and prevents the metal reacting further. It is because of this reason that although aluminium is a highly reactive metal, it is still used in food packaging.

Or

(d) Sodium is highly reactive metal and reacts vigorously with the oxygen, carbon dioxide and moisture present in the air such that it may even cause a fire. To prevent this explosive reaction, Sodium is kept immersed in kerosene because Sodium doesn't react with kerosene.

Like sodium, potassium is another metal which is stored in kerosene.

38. (a) Thyroid gland is an endocrine gland. It is located below the Adam's apple in the lower part of the neck and wraps around the wind pipe (trachea).

(b) It manufactures hormones that help to regulate the body's metabolism including growth and other functions of the body.

(c) Hashimoto's disease, Grave's disease, goitre and thyroid nodules.

Or

(d) Restlessness, nervousness, racing heart, irritability, increased sweating, shaking, anxiety, thin skin, brittle hair and nails, weight loss, bulging eyes and muscle weakness. (any four)

39. (a) At noon when the sun is overhead, the light has lesser air to travel and so it is scattered the least and hence appears white.

(b) The propagation of light of different colours of white in air moves with the same speed but different wavelengths and frequencies.

(c) Rainbows are formed when the light from the sun is scattered by water droplets of rain or fog through a process called refraction. The other phenomenon involved in the formation of rainbow are, total internal reflection and dispersion.

Or

(d) The stars seem higher than they actually are because of the phenomenon of atmospheric refraction.

When the light from a star descends on the Earth's surface, it passes through the different layers of atmosphere (the atmospheric layer at higher levels is rarer than the air near earth's surface).

The light coming from the star bends more sharply when it passes through the successive denser layer of earth's atmosphere.



SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

SECTION : A

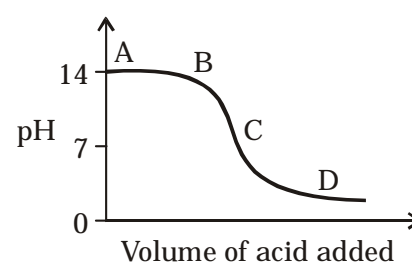
(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. The graph given below depicts a neutralization reaction (acid + alkali \rightarrow salt + water).

The pH of a solution changes as we add excess of acid to an alkali.

Which letter denotes the area of the graph where both acid and salt are present? 1

- (a) A (b) B
(c) C (d) D



2. A student adds lead and silver to two different test tubes containing an equal amount of copper sulphate solution. The student observes that the color of the solution in the test tube with lead changes. What explains the change in the colour of the solution? 1

- (a) A displacement reaction takes place as lead replaces copper from the solution.
(b) A combination reaction takes place as lead combines with sulphate in the solution.
(c) decomposition reaction takes place as copper dissociates from sulphate in the solution.
(d) A double displacement reaction takes place as copper dissociates from sulphate and lead combines with sulphate in the solution.

3. The pair(s) which will show displacement reaction is/are :

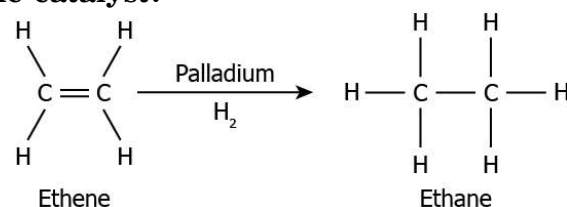
- (i) NaCl solution and copper metal
(ii) AgNO₃ solution and copper metal
(iii) Al₂(SO₄)₃ solution and magnesium metal
(iv) ZnSO₄ solution and iron metal 1

- (a) (ii) only (b) (ii) and (iii) (c) (iii) and (iv) (d) (i) and (ii)

4. The image represents a chemical reaction where an unsaturated hydrocarbon is converted into a saturated hydrocarbon in the presence of a catalyst. 1

Which option identifies the action of the catalyst?

- (a) it causes a reaction to proceed without the reaction itself being affected
(b) it causes the removal of all hydrogen atom bonded to the carbon atom
(c) causes to change the single bonds to double and triple bonds
(d) causes the production of oxygen during the reaction



5. What happens when a pellet of sodium is dropped in water? 1
 (a) It catches fire and forms oxide. (b) It absorbs heat and forms oxide.
 (c) It catches fire and forms hydroxide. (d) It absorbs heat and forms hydroxide.

6. The chemical reaction shows the reactants for the formation of baking soda.

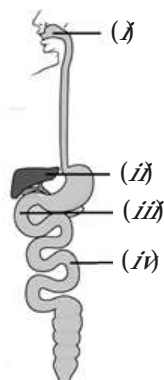


What are X and Y? 1

- (a) X: HCl; Y: NaHCO₃ (b) X: NH₄Cl; Y: NaHCO₃
 (c) X: NH₄Cl; Y: NaHCO₂ (d) X: NH₃Cl; Y: NaHCO₃
7. A student studies that the carbon compounds CH₃OH, C₂H₅OH, C₃H₇OH, and C₄H₉OH can be group as homologues series. Why are these compounds grouped as homologous series? 1

- (a) because of an increase in number of carbon atom along the series
 (b) because of an increase in number of hydrogen atom along with the series
 (c) because of the presence of the same functional group substitute for hydrogen in a carbon chain
 (d) because of the presence of the same carbon compounds substitute for hydrogen in a carbon chain

8. Observe the diagram of human digestive system.



Column I	Column II
(i)	A. The length of this depends on food the organism eats.
(ii)	B. Initial phase of starch digestion.
(iii)	C. Increases the efficiency of lipase enzyme action.
(iv)	D. This is the site of the complete digestion of carbohydrates, proteins and fats.

Match the labeling referred in column I and correlate with the function in column II. 1

- (a) (i) — A; (ii) — B; (iii) — C; (iv) — D.
 (b) (i) — B; (ii) — C; (iii) — D; (iv) — A.
 (c) (i) — B; (ii) — D; (iii) — C; (iv) — A.
 (d) (i) — D; (ii) — A; (iii) — B; (iv) — C.

9. A student sets up an experiment to study the importance of nutrition in plants. The student takes 2 pots, pot 1 and pot 2 each with the same healthy plant. Both the pots were placed in the garden and watered properly. Pot 1 was kept as such, while pot 2 was kept in an air tight glass box with caustic soda. Caustic soda absorbs carbon dioxide present in the surrounding. After 2 days, the student observes that the plant kept in the garden is healthy while the plant placed in container shed leaves and droops. What is the likely reason for this observation?

- (a) lack of nutrients in the soil
 (b) absence of oxygen for survival
 (c) inability to perform photosynthesis
 (d) absorption of light by caustic soda restricting growth

10. From the list given below, select the character which can be acquired but not inherited 1

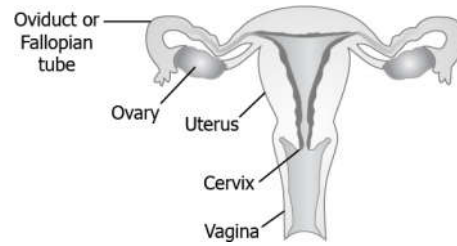
- (a) colour of eye (b) colour of skin (c) size of body (d) nature of hair

11. Which option correctly shows the order of events when a bright light is focused on our eyes? 1

- (a) Bright light → receptors in eyes → sensory neuron → spinal cord → motor neurons → eyelid closes
- (b) Bright light → receptors in eyes → spinal cord → sensory neuron → motor neurons → eyelid closes
- (c) Bright light → receptors in eyes → sensory neuron → motor neurons → spinal cord → eyelid closes
- (d) Bright light → receptors in eyes → spinal cord → motor neurons → sensory neuron → eyelid closes

12. The image shows the female reproductive system. 1

Which event will be likely affected, if a female's uterus is implanted with intrauterine device?

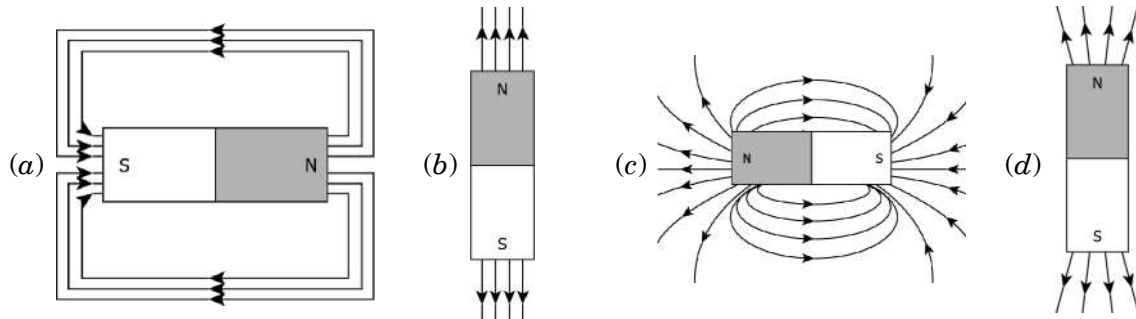


- (a) release of eggs
- (b) entering of sperms
- (c) maturation of eggs
- (d) implantation of embryo

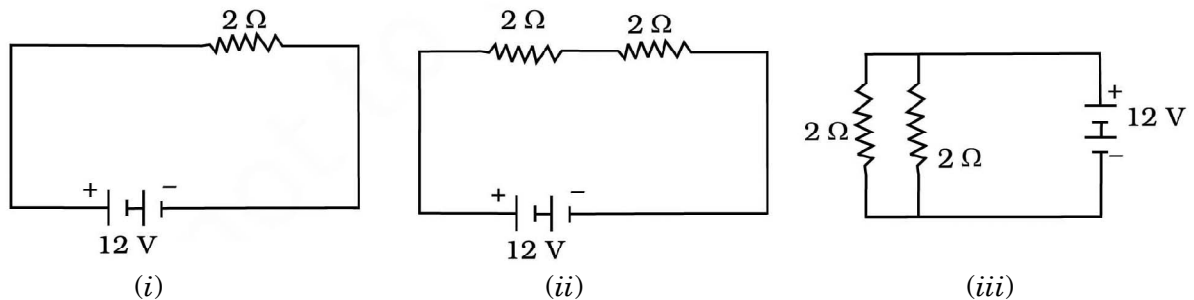
13. In order to reduce electricity consumption at home, what kind of appliance should one purchase? 1

- (a) one which draws low power
- (b) one which produces less heat
- (c) one which operates at a higher voltage
- (d) one which draws a high amount of current

14. A student learns that magnetic field strength around a bar magnet is different at every point. Which diagram shows the correct magnetic field lines around a bar magnet? 1

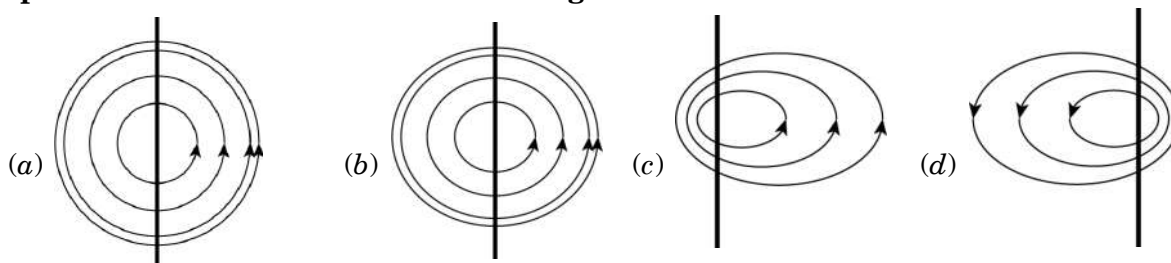


15. In the following circuits (Figure), heat produced in the resistor or combination of resistors connected to a 12 V battery will be 1



- (a) same in all the cases
- (b) minimum in case (i)
- (c) maximum in case (ii)
- (d) maximum in case (iii)

16. A student placed a magnetic compass around a straight current carrying wire. The student noticed when he moved the compass away from the wire, the deflection in compass decreases. How would be the magnetic field lines around the conductor? 1



(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is False but R is true

17. Assertion : $2\text{Mg} + \text{O}_2 \xrightarrow{\text{Heat}} 2\text{MgO}$ is a redox reaction.

Reason : Mg is oxidised and O_2 is reduced. 1

18. Assertion : There is an inbuilt tendency to variation during reproduction.

Reason : There are errors in DNA copying during reproduction. 1

19. Assertion : The separation of the right side from left side of the heart allows a highly efficient supply of oxygen to the body.

Reason : The separation of the two sides of the heart causes mixing of oxygen rich and oxygen deficient blood. 1

20. Assertion : It is easier to bring north pole of a magnet to south pole of other magnet.

Reason : There is a force of attraction between unlike poles of magnet. 1

SECTION : B

(Q. no. 21 to 26 are very short answer questions.)

21. What is distilled water ? Why does it not conduct electricity ? 2

Or

Give reasons for the following :

(a) Sodium metal is kept immersed in kerosene.

(b) Blue colour of copper sulphate solution disappears when some aluminium powder is added in it.

22. Define neuron. Name the parts of the neuron where : 2

(i) Information is acquired.

(ii) Impulse must be converted into a chemical signal for onward transmission.

23. Explain the process of assimilation of proteins in human digestive system. 2

24. Define dialysis. When it is needed by a person ? 2

25. Sushil went to an eye specialist for check up. He prescribed him to use spectacle lens of + 0.5D power.

(a) Name the defect of vision he is suffering from.

(b) Find the focal length of spectacle lens. 2

Or

A person is not able to see distinctly the objects placed beyond 90 cm from him. Giving reason to identify the defect in his eye. Determine the nature of lens used to correct the defect.

26. Recycling is considered as a welcome practice to deal with the environmental problems. Justify this statement with two arguments. **2**

SECTION : C

(Q.no. 27 to 33 are short answer questions.)

27. State one example each characterized by the following along with the chemical equation :

(a) Change in state.

(b) Evolution of gas.

(c) Change in temperature. **3**

28. A compound 'A' is used in fire extinguishers, and an antacid and its small amount is also used in making bakery items. Identify the compound and also explain the reason for the above mentioned uses of the compound 'A'. **3**

29. (a) How is lymph formed ?

(b) Write two points of difference between blood and lymph. **3**

Or

What is the basic unit of the kidney called ? Why is it composed of a cluster of very thin-walled blood capillaries ?

30. Define magnification produced by a spherical mirror in terms of height of an object and image. How is it related to object and image distance ? Explain why magnification is positive for virtual image and negative for real image. **3**

31. What is meant by power of a lens ? Write its SI unit. A student uses a lens of focal length 40 cm and another of – 20 cm. Write the nature and power of each lens. **3**

32. With the help of a diagram showing experimental arrangement describe an activity to show how an electromagnet can be made in a school laboratory. **3**

Or

Draw the pattern of magnetic field lines due to a bar magnet.

The magnetic field lines are closed curves. Why ?

33. It is said that, there is a need to put a complete ban on the products containing aerosols. What are aerosols ? Why is there a demand to put a ban on them ? **3**

SECTION : D

(Q.no. 34 to 36 are Long answer questions.)

34. Carbon can neither form C^{4+} cations nor C^{4-} anions but form covalent compounds. Justify this statement. Also, give reasons why covalent compounds are poor conductor of electricity. **5**

Or

Explain the following statements :

(i) Ethane is a covalent compound.

(ii) Carbon atoms form a strong bond.

(iii) Carbon shows catenation property.

(iv) Pentane has high boiling point than methane.

(v) Double bonds are present in alkene. **5**

35. How does vegetative propagation occur in nature ? Explain with four different examples. **5**

Or

Define pollination. Differentiate between self- pollination and cross-pollination. If from a bisexual flower the young stamen is removed artificially, even then the flower produces fruits. How does it take place ?

36. (a) A current 'I' is flowing through a resistor 'R' having potential difference 'V' across its ends and in time t charge 'Q' flows. Derive an expression for the heat produced.

(b) What will happen to the heat produced if the current passing through an electric heater has been halved ?

5

SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.

Internal choice is provided in one of these sub-parts.)

37. Rahul is a skilled painter. He mixed a white coloured powder, compound X with water. The compound X reacted vigorously with water to produce a compound Y and a large amount of heat. Then, Rahul used the compound Y for white washing the walls. Customer was not satisfied with the work of Rahul as walls were not shining. But Rahul guaranteed him that the walls would shine after 2-3 days. And after 3 days of whitewash, the walls became shiny.



(a) Name the compound X that Rahul mixed with water and the compound Y he got after mixing. 1

(b) Write the name and formula of the substance responsible for shiny finish of the walls after 2-3 days? 1

(c) Write the complete equation and type of the reaction takes place in the formation of substance Y from the substance X. 2

Or

(d) Write the complete equation and type of the reaction responsible for shiny finish of the walls?

38. The gland shown in the picture is a small butterfly found at the base of the neck. This gland makes a hormone that travels in blood to all parts of our body and regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth. This hormone also controls body's metabolism in many ways. Several disorders can arise when our thyroid produces too much hormone (hyperthyroidism) or not enough hormones (hypothyroidism). Some of the symptoms of hyperthyroidism are, very high body temperature, rapid heart-beats and shortness of breath. Due to hypothyroidism it may cause goiter, heart problems, mental health issues, infertility and birth defects.



(a) Which gland is referred to in the given picture? What type of a gland is this? 1

(b) What does this gland secrete? How does it control body functions? 1

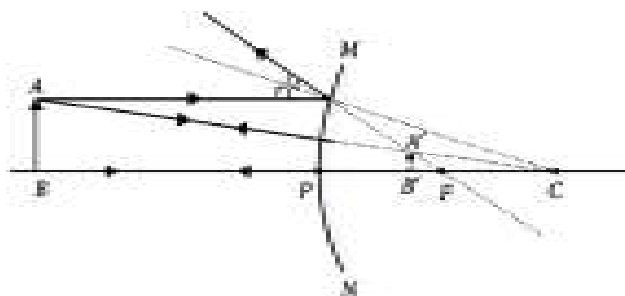
(c) Name the disorder caused due to the over secretion of the hormone secreted by this gland. How does it affect our body? 2

Or

(d) Which is more common, hyperthyroidism or hypothyroidism? Name some disorders caused due to less secretion of thyroid hormone.

39. Convex mirrors are used as a vigilance mirror, parking lots, security purposes, reflector for street lights and rear-view mirrors in vehicles.

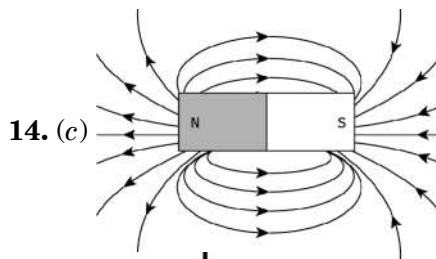
The image formed in a convex mirror is diminished, due to which it gives a wide field of view of the traffic behind the vehicle. Consider a convex mirror used on a moving automobile (observe the ray diagram given below), with radius of curvature 2 m and a truck is coming from behind it by maintaining a constant distance of 3.5 m.



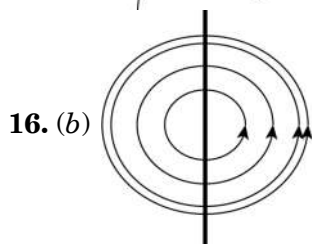
- (a) What will be the size of the image relative to the size of the truck? 1
 (b) What will be the nature and size of image if instead of 3.5 m, truck maintains a distance of 2 m? 1
 (c) Write four characteristics of image formed by convex mirror. 2
- Or*
- (d) What will be the nature, position and distance of the image formed?

Answers

- (d) D
- (a) A displacement reaction takes place as lead replaces copper from the solution.
- (b) (ii) and (iii)
- (a) it causes a reaction to proceed without the reaction itself being affected
- (c) It catches fire and forms hydroxide. 6. (b) X: NH_4Cl ; Y: NaHCO_3
- (c) because of the presence of the same functional group substitute for hydrogen in a carbon chain
- (b) (i) — B; (ii) — C; (iii) — D; (iv) — A. 9. (c) inability to perform photosynthesis
- (c) size of body
- (a) Bright light → receptors in eyes → sensory neuron → spinal cord → motor neurons → eyelid closes
- (d) implantation of embryo
- (a) one which draws low power



15. (d) maximum in case (iii)



- (a) Both A and R are true and R is the correct explanation of A
- (a) Both A and R are true and R is the correct explanation of A
- (c) A is true but R is false
- (a) Both A and R are true and R is the correct explanation of A
- Distilled water is the water that has virtually all of its impurities removed through distillation.
 - In distilled water, there are no impurities, no ions. There are only neutral water molecules having no charge. So, distilled water does not conduct electricity.

Or

- (a) Sodium reacts so vigorously with air that it catches fire if kept in the open. Hence, to protect it and to prevent accidental fires, it is kept immersed in kerosene oil.
- (b) Aluminium is more reactive than copper. It displaces copper from copper sulphate solution and forms aluminium sulphate, leaving copper behind. Hence, the colour changes.

22. • Neuron is the basic unit of the nervous system.
- (i) Dendrites, (ii) Nerve endings.
23. • The different types of protein in the food are converted into 'amino acids' after digestion.
- The amino acids are absorbed by blood and transported through blood vessels to cells and tissues.
 - In the cells, the amino acids are used up for building components of cells and tissues.
24. • Dialysis is a process by which nitrogenous waste products from the blood are removed using an artificial kidney.
- It is used in the case of kidney failure.
25. (a) Hypermetropia (far-sightedness)

(b) Power = + 0.5 D

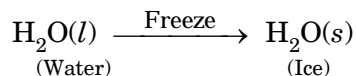
$$P = \frac{1}{f}$$

$$0.5 = \frac{1}{f}$$

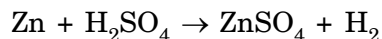
$$f = \frac{1}{0.5} = + 2 \text{ m}$$

Or

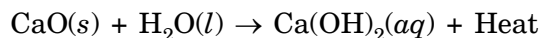
- It is because the image of a distant object is formed in front of the retina and not at the retina itself.
 - Myopia (Near-sightedness). As the eye cannot see the far object clearly beyond 90 cm so defect is myopia or near sightedness.
 - Concave lens is used to bring the image back on to the retina and thus the defect is corrected.
26. Recycling is considered as a welcome practice to deal with the environmental problems because :
- (i) It prevents land, water and soil pollution.
 - (ii) It also helps in conserving resources as resources are used again and again.
27. (a) Change of water into ice is an example of change of state.



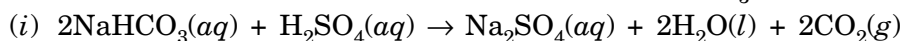
(b) By placing zinc granules in H_2SO_4 solution, hydrogen gas is evolved and zinc sulphate is formed. This is an example of evolution of gas.



(c) Calcium oxide reacts vigorously with water to produce slaked lime releasing a large amount of heat. This is an example of change in temperature.



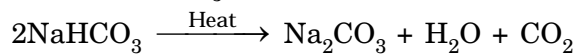
28. • Compound 'A' is sodium hydrogen carbonate (NaHCO_3).



NaHCO_3 reacts with H_2SO_4 to release water and carbon dioxide, it extinguishes fire. So, it is used in soda-acid fire-extinguisher.

(ii) It lowers the acidity of stomach so is used as an antacid, being a base.

(iii) When NaHCO_3 is heated, carbon dioxide gas is produced.



- CO_2 produced during the reaction causes bread and cakes to become soft and spongy so used in making bakery items.

29. (a) Through the pores present in the walls of capillaries some amount of plasma, protein and blood cells escape into intercellular spaces in the tissues and form a tissue fluid called lymph.

(b)

Blood	Lymph
1. The constituents of blood are RBC, WBC, platelets and plasma. 2. It is red in colour because of the presence of a red coloured pigment called haemoglobin in the Red Blood Cells. 3. It flows in both directions <i>i.e.</i> body organs to the heart and vice-versa. 4. It flows through arteries and veins.	1. The constituents of lymph are plasma and lymphocytes. 2. It is colourless. 3. Its flow is unidirectional <i>i.e.</i> from body organs to the heart. 4. It flows through lymphatic vessels.

(Any two points)

Or

- The basic unit of kidney is called nephron.
- Each nephron is covered with fine blood vessels called blood capillaries.
- Through blood capillaries, the useful components of blood are re-absorbed while the harmful (nitrogenous wastes) are released in the form of urine.
- Each capillary cluster in the kidney is associated with the cup-shaped end of a tube that collects the filtered urine.

30. Magnification (m) of an object is expressed as the ratio of height of the image to the height of the object.

Magnification can also be expressed as ratio of negative of image distance to object distance.

$$m = \frac{\text{height of image } (h)}{\text{height of object } (H)}$$

$$\text{or } m = - \frac{v(\text{image-distance})}{u(\text{object-distance})}$$

In virtual image, image formed is above the principal axis which is taken as positive whereas the real image formed below the principal axis is to be taken as negative while height of object remains positive.

Hence, for virtual image, magnification is positive and for real image, it is negative.

31. Power of a lens is the degree of convergence or divergence of rays of light achieved by a lens. Power of a lens is the reciprocal of its focal length. SI unit of power of lens is Dioptre (D).

$$\text{Focal length, } f = 40 \text{ cm} = 0.4 \text{ m}$$

$$P = \frac{1}{f} = \frac{1}{0.4 \text{ m}} = + 2.5 \text{ D}$$

Power of lens : + 2.5 D

Nature of lens : Convex lens

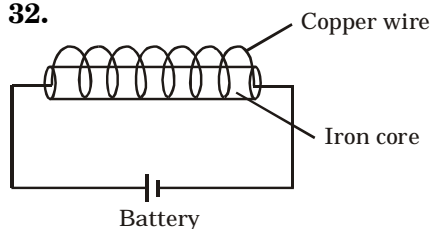
$$\text{Focal length, } f = - 20 \text{ cm} = - 0.2 \text{ m}$$

$$P = \frac{1}{f} = \frac{1}{- 0.2 \text{ m}} = - 5 \text{ D}$$

Power of lens : - 5D

Nature of lens : Concave lens

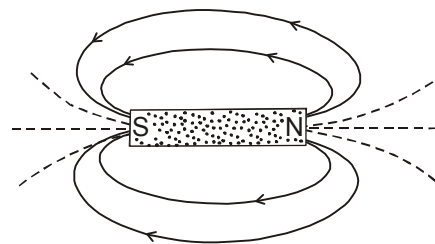
32.



It is fairly easy to build an electromagnet in the school laboratory. Wrap some insulated copper wire around an iron core and attach a battery to the wire. An electric current will begin to flow and iron core will be magnetized. When a battery is disconnected, the iron core loses its magnetism.

Or

Magnetic field is a physical quantity that has both direction and magnitude in a way that when we take a bar magnet of big size the magnitude will increase and in a bar magnet the field lines emerge from North and enter in a South.



- 33.**
- Aerosols are the colloidal system of solid or liquid particles in a gas.
 - Aerosols cause to destroy the ozone layer which protects us from harmful ultraviolet radiations.
 - Aerosols also affect our health adversely. Inhaling aerosols may cause sneezing, coughing, vomiting, diarrhoea, slurred speech, double vision, drowsiness and muscle pain.
 - Therefore, there is demand to put ban on them.

34. Carbon can neither form C^{4+} cations nor C^{4-} anions, because

(a) to form C^{4-} anion, carbon must gain four electrons, but it would be difficult for the nucleus having six protons to hold on to ten electrons *i.e.*, four extra electrons.

(b) to form C^{4+} cation, carbon must lose four electrons, but it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus holding on to just two electrons.

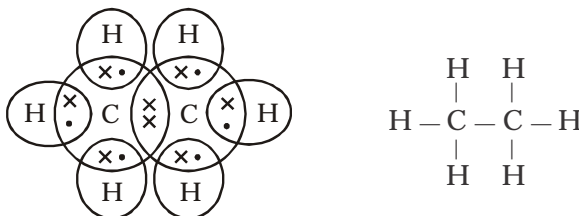
So, it forms covalent compounds.

(i) Covalent compounds are bad conductors of electricity, because the bonding in these compounds does not give rise to any ions.

(ii) Covalently bonded molecules have strong bonds within the molecule, but intermolecular forces are small, so they have low melting and boiling points.

Or

(i) In ethane, carbon and hydrogen atoms complete their octet by sharing the valence electrons with other atoms of carbon or with hydrogen atoms, so the nature of bonding in the molecule is covalent.

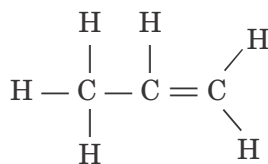


(ii) Carbon forms covalent bonds by sharing of electrons. Due to its small size and high nuclear charge, it forms strong bonds.

(iii) Carbon atoms form compounds by forming covalent bonds in a long chain of other carbon atoms, branched chains or even carbon atoms arranged in rings. In addition, carbon atoms may be linked by single, double or triple bonds by other carbon atoms. Since it can form large molecules through covalent bonding with other carbon atoms, carbon exhibits the property of catenation.

(iv) Because molecular mass of pentane C_5H_{12} is higher than methane (CH_4).

(v) In alkenes, one valency per carbon atom remains unsatisfied. This can be satisfied only if there is a double bond between the two carbon atoms. For example, C_3H_6 .



35. • There are many plants in which parts like the root, stem and leaves develop into new plants under appropriate conditions. This is called as vegetative propagation.

- Examples of vegetative propagation :

(i) **Adventitious buds** : In *Bryophyllum*, adventitious buds grow in the notches along the leaf margin, which when fall on the soil, develop into new plants.

(ii) **Cutting** : A piece of stem, root, leaf or even a bulb scale is placed partly under moist soil which grows into a new plant. *e.g.*, rose, sugarcane etc.

(iii) **Layering** : A part of the stem is pulled out and buried in the soil. The layered stem grows into a new plant. *e.g.*, citrus, strawberry etc.

(iv) **Grafting** : In grafting, two parts from two different plants are joined together so that they can unite and grow into a new plant. *e.g.*, mango, guava etc.

Or

- **Pollination** : The process of transfer of pollen grains from the stamen to stigma is called 'pollination'.

Self-pollination : When the pollen grains from the stamen are transferred to stigma of the same flower, it is called 'self-pollination'.

Cross-pollination : When the pollen grains from the stamen of one flower are transferred to the stigma of another flower, it is called 'cross-pollination'.

- Many plants having bisexual flowers, prefer to be pollinated by cross-pollination method. It helps to increase their productivity.

- The removal of stamens does not affect the process of cross-pollination in these plants.
- Therefore they produce the fruits after fertilisation by cross-pollination method.

36. (a) Let us consider a current I flowing through a resistor of resistance R . Let the potential difference across it be V .

Let t be the time during which a charge Q flows across.

\therefore Work done for flow of charge, $W = VQ$ in time t .

Hence, the power, $P = V \times \frac{Q}{t} = V \times I$ [$\because Q = I \times t$]

where I is current flowing for time t .

As $V = IR$, hence
 $P = IR \times I = I^2R$

\therefore Energy supplied to the circuit by the source in time,
 $E = P \times t = I^2Rt$

This energy gets dissipated in the resistor as heat.

Hence, the amount of heat produced, $H = I^2Rt$ Joule.

(b) We know, $H = I^2Rt$...(1)

When $I' = \frac{I}{2}$. So, $H' = \left(\frac{I}{2}\right)^2 R t = \left(\frac{I^2}{4}\right) R t$...(2)

Comparing equations (1) and (2),

$$\frac{H}{H'} = \frac{I^2 R t}{\frac{I^2}{4} R t} = 4$$

$$\boxed{H' = \frac{H}{4}}$$

Heat produced will be $\frac{1}{4}$ times.

37. (a) Compound X is Calcium oxide or CaO and compound Y is Calcium hydroxide or Ca(OH)₂
(b) Calcium carbonate, CaCO₃
(c) CaO + H₂O → Ca(OH)₂, Combination reaction or Exothermic reaction

Or

(d) Ca(OH)₂ + CO₂ → CaCO₃ + H₂O, Double displacement reaction or neutralization reaction

38. (a) It is thyroid gland. It is an endocrine gland.

(b) This gland secretes thyroid hormone which regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth.

(c) Hyperthyroidism is caused due to overactive thyroid gland. The high level of thyroid gland can lead to weight loss, increased heart rate and heat intolerance.

Or

(d) Hypothyroidism is more common than hyperthyroidism. The less secretion of thyroid hormone may lead to goiter, heart problems, mental health issues, infertility and birth defects.

39. (a) 0.22

(b) The image still will be virtual, erect and diminished.

(c) (i) It is always formed behind the mirror, between the pole and its focus.

(ii) Whatever be the position of object, the image is always virtual and erect.

(iii) The size of image is always smaller than the object.

(iv) Magnification is always positive.

Or

(d) The nature of the image formed is virtual and erect.

It is formed behind the mirror at a distance of 0.78 m from the pole of the mirror.



SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

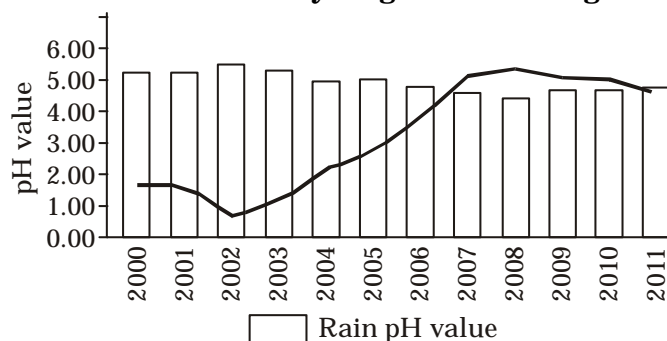
Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

SECTION : A

(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. In which year is concentration of hydrogen ion the highest? 1



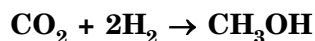
(a) 2002

(b) 2008

(c) 2011

(d) 2005

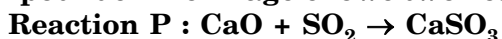
2. A student writes a chemical equation of the reaction between carbon monoxide and hydrogen.



How can the reaction be classified? 1

- (a) The reaction is an example of a combination reaction as a compound separates into two compounds.
- (b) The reaction is an example of a decomposition reaction as a compound dissociates into two compounds.
- (c) The reaction is an example of a combination reaction as two compounds react to form a single compound.
- (d) The reaction is an example of a decomposition reaction as two compounds react to form a single compound.

3. A student learns that some products are formed as a result of combining two compounds while some compounds are formed as a result of dissociation of two compounds. The image shows two reactions.



Which reaction is an example of a combination reaction and a decomposition reaction? 1

- (a) both the reactions are examples of combination reaction
- (b) both the reactions are examples of a decomposition reaction
- (c) reaction P is an example of a combination reaction while reaction Q is an example of a decomposition reaction
- (d) P is an example of a decomposition reaction while reaction Q is an example of a combination reaction

4. The chemical reaction shows the addition of chlorine to methane in the presence of sunlight.



What is likely to be the product of the reaction represented by “X” ? 1

- (a) $\text{CH}_4 + \text{H}_2\text{SO}_4$ (b) $\text{CH}_3\text{Cl} + \text{HCl}$ (c) $\text{CHCl}_3 + \text{HCl}$ (d) $\text{CH}_3\text{Cl} + \text{H}_2\text{SO}_4$

5. Which product is formed in the chemical reaction between a small strip of magnesium and nitric acid? 1

- (a) MgNO_3 and 2H_2 (b) MgNO_3 and H_2O
 (c) $\text{Mg}(\text{NO}_3)_2$ and 2H_2 (d) $\text{Mg}(\text{NO}_3)_2$ and H_2O

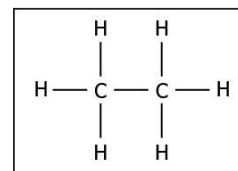
6. Washing soda is obtained from the recrystallization of sodium carbonate. How is sodium carbonate obtained from baking soda ? 1

- (a) by heating the baking soda (b) by adding water to baking soda
 (c) by reacting the baking soda with acid (d) by reacting the baking soda with base

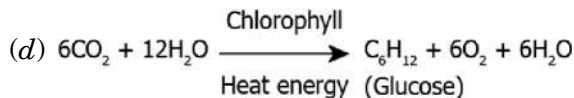
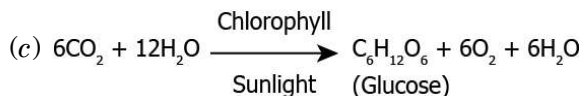
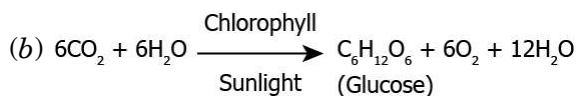
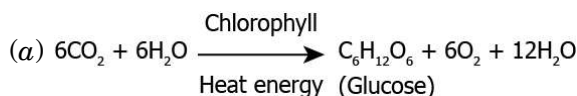
7. The image represents the structure of a carbon compound known as ethane. 1

Which option explains the naming of ethane?

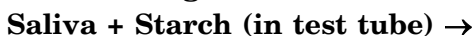
- (a) the presence of functional group connected with a single bond
 (b) as it contains two carbon atoms and a single bond connects the carbon atoms
 (c) carbon compound with a total number of eight atoms are named as ethane
 (d) as it contains six hydrogen atoms and a single bond connects the carbon and hydrogen atom



8. Which of the equation show correct conversion of CO_2 and H_2O into carbohydrates in plants? 1



9. An incomplete equation for the digestion of starch using saliva is shown as :



What will be the likely outcome of this? 1

- (a) Saliva will convert starch into complex fat molecules.
 (b) Saliva will convert starch into complex sugar molecules.
 (c) Saliva will breakdown starch into simple sugar molecules.
 (d) Saliva will breakdown starch into simple protein molecules.

10. How life might have originated on earth was experimentally shown by

- (a) Urey and Miller (b) Oparin and Haldane
 (c) Watson and Crick (d) None of the above

11. When we touch the leaves of “touch-me-not” plant, they began to fold up and droop.

How does the plant communicate the information of touch? 1

- (a) The plant uses electrical signals to transfer information from external environment to cells.
- (b) The plant uses electrical- chemical signals to transfer information from cell to cell.
- (c) The plant uses electrical- chemical signals to transfer information from tissue to specialized cells.
- (d) The plant uses electrical signals to transfer information from cell to specialized tissues.

12. The table lists some changes that occur inside the female body after fertilization of egg with sperm.

A. Rhythmic contractions of uterus muscle for child birth.	C. Implantation of embryo.
B. Formation of placenta.	D. Development of organs in foetus.
D. Development of organs in foetus.	E. Cell division of zygote.

Which option correctly sequences these events? 1

- (a) C → B → E → A → D
- (b) E → C → D → B → A
- (c) E → C → B → D → A
- (d) C → E → A → B → D

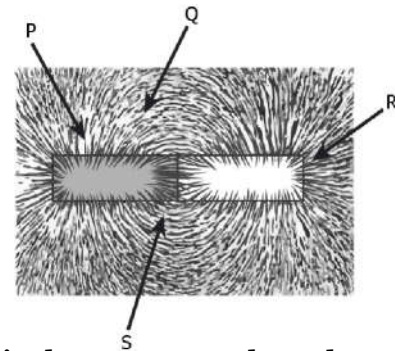
13. An electric toaster has a power rating of 200 W. It operates for 1 hour in the morning and 1 hour in the evening. How much does it cost to operate the toaster for 10 days at Rs 5 per kW h ? 1

- (a) ₹ 20
- (b) ₹ 400
- (c) ₹ 5000
- (d) ₹ 10000

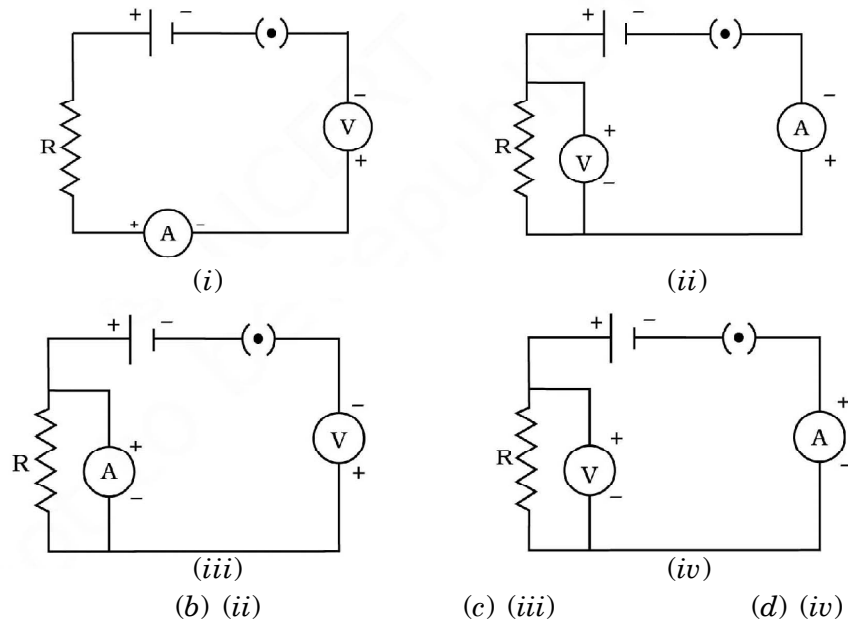
14. A student places some iron fillings around a magnet. The iron fillings arrange themselves as shown in image.

The student labelled four different regions around the magnet. Where would be the magnetic be the strongest? 1

- (a) P
- (b) Q
- (c) R
- (d) S

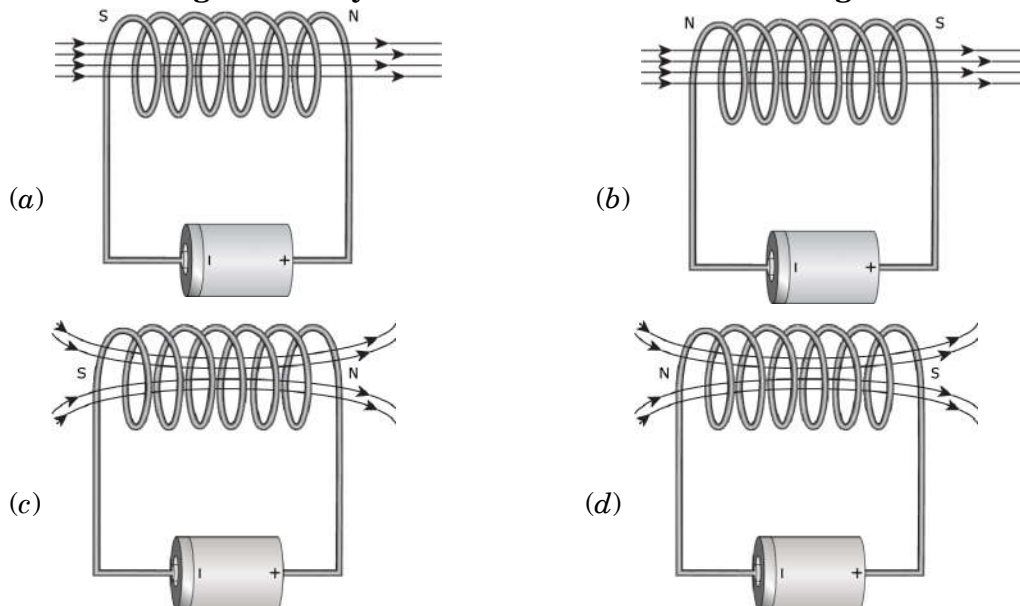


15. Identify the circuit (Figure 12.3) in which the electrical components have been properly connected. 1



- (a) (i)
- (b) (ii)
- (c) (iii)
- (d) (iv)

16. The magnetic field lines of solenoid are similar to the magnetic field lines of bar magnet. Which image correctly shows the solenoid as a bar magnet? 1



(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is False but R is true

17. **Assertion** : $\text{Na}_2\text{SO}_4(aq) + \text{BaCl}_2(aq) \longrightarrow \text{BaSO}_4(s) + 2\text{NaCl}(aq)$

It is a double displacement reaction. 1

Reason : Two types of products are formed.

18. **Assertion** : Different individuals would have different kinds of advantages depending on the nature of variations.

Reason : Selection of variants by environmental factors forms the basic for evolutionary processes. 1

19. **Assertion** : Veins don't need thick walls.

Reason : Veins collect the blood from different organs and bring it back to the heart. 1

20. **Assertion** : An electric current through a copper wire produces a magnetic effect.

Reason : Electricity and magnetism are linked to each other. 1

SECTION : B

(Q. no. 21 to 26 are very short answer questions.)

21. What are antacids ? Explain their role in providing relief from stomach ache. Give two examples. 2

Or

Can we place silver nitrate solution in an iron vessel ? Give reason for your answer with a balanced chemical equation.

22. (a) Name one gustatory receptor and one olfactory receptor present in human beings.

(b) Write *a* and *b* in the given flow chart of neuron through which information travels as an electrical impulse.



2

- 23.** Mention the site of photosynthesis. List basic requirements for this process to occur. **2**
- 24.** State in brief the function of :
 (a) Renal artery (b) Kidney (c) Ureter (d) Urinary bladder **2**
- 25.** A person suffering from an eye-defect uses lenses of power $-1D$ to correct the defect. Name the defect he is suffering from and the nature of lens to be used to correct it. **2**

Or

- Change of size of eyeball can be one of the reasons for :
 (a) Myopic (b) Hypermetropic eye.
- 26.** From the following list, select the items which constitute electronic waste : Mobile phone, T.V., Keyboard, Pressure cooker, Key ring, Pendrive and Table. **2**

SECTION : C

(Q.no. 27 to 33 are short answer questions.)

- 27.** Name the substance oxidised and the substance reduced, and also identify the oxidizing agent and reducing agent in the following reactions :
 (a) $3MnO_2 + 4Al \rightarrow 3Mn + 2Al_2O_3$ (b) $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$
 (c) $SO_2 + 2H_2S \rightarrow 3S + 2H_2O$ **3**
- 28.** A compound 'X' has the property of hardening when mixed with water. This compound is prepared from gypsum.
 (a) Identify the compound and write the chemical name of gypsum.
 (b) Write the chemical equation for its preparation.
 (c) List any two uses of this compound. **3**
- 29.** What are nephrons ? How is nephron involved in the filtration of blood and formation of urine ? **3**

Or

- Draw a diagram of human excretory system and label the following :
 (i) Urinary bladder (ii) Left kidney (iii) Left ureter.
- 30.** 4.5 cm needle is placed 12 cm away from a convex mirror of focal length 15 cm. Give the location of image and magnification. Describe what happens to the image as the needle is moved farther from the mirror. **3**
- 31.** An object is placed at an infinity in front of a converging lens. Tabulate the changes observed in the size of image formed if the object starts moving from infinity to focus. **3**
- 32.** Name and state the rule that helps to find the force on a current carrying conductor in a magnetic field. **3**

Or

- What is meant by magnetic force ? How does this force get affected on :
 (i) doubling the magnitude of current,
 (ii) reversing the direction of current flow and
 (iii) reversing the direction of magnetic field ?
- 33.** What is the reason that some substances are biodegradable and some non-biodegradable ? **3**

SECTION : D

(Q.no. 34 to 36 are Long answer questions.)

- 34.** An organic compound 'A' of molecular formula $C_2H_4O_2$ is widely used as preservative in pickles. This compound reacts with ethanol to form a sweet smelling compound 'B'.
 (i) Identify the compound 'A'.
 (ii) Write the chemical equation for the reaction involved.
 (iii) Name the reaction.
 (iv) Name the gas produced when compound 'A' reacts with washing soda. Write chemical equation for the reaction. **5**

Or

(i) Define covalent bonding and give one example of an element other than carbon which forms covalent bond.

(ii) State the number of valence electrons and valency of carbon atom.

35. (a) Compare the processes of pollination and germination.

(b) Mention any two agents for cross-pollination.

5

Or

Compare the role of the following parts based on their functions :

(a) Pollen grain and Sperm (b) Ovule and Egg (c) Pollen tube and Fallopian tube

36. (a) Give reasons for the following :

(i) Tungsten used almost exclusively for filament of electric lamp.

(ii) Copper and aluminium wires are usually employed for electricity transmission.

(b) Describe an activity with the help of circuit diagram to show that potential difference across each resistor connected in parallel is same.

5

SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.)

Internal choice is provided in one of these sub-parts.)

37. On the basis of reactivity of different metals with oxygen, water and acids as well as displacement reactions, the metals have been arranged in the decreasing order of their reactivities. This arrangement is known as activity series or reactivity series of metals.

The basis of reactivity is the tendency of metals to lose electrons. If a metal can lose electrons easily to form positive ions, it will react readily with other substances. Therefore, it will be a reactive metal. On the other hand, if a metal loses electrons less rapidly to form a positive ion, it will react slowly with other substances. Therefore, such a metal will be less reactive.

Potassium	most reactive	K
Sodium		Na
Calcium		Ca
Magnesium		Mg
Aluminium		Al
Zinc		Zn
Iron		Fe
Tin		Sn
Lead		Pb
(Hydrogen) N.M.		(H)
Copper		Cu
Silver		Ag
Gold		Au
Platinum	least reactive	Pt

(a) What happens when a copper coin is placed in a bowl of water for two days? **1**

(b) Hydrogen gas is not evolved when a metal reacts with nitric acid, because it is a very strong oxidising agent. Name two metals which react with very dilute (1%) HNO_3 and evolve H_2 gas. **1**

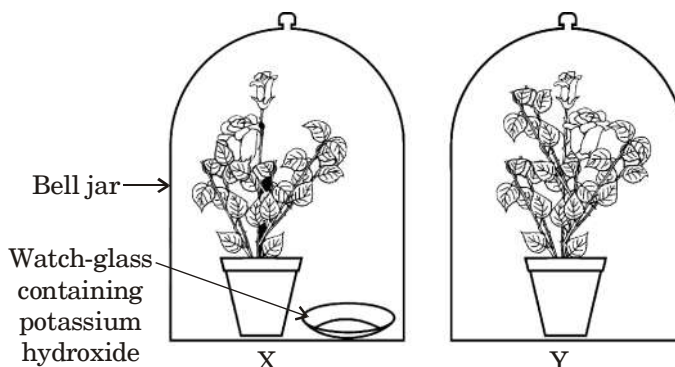
(c) Hydrogen is not a metal, but it has been assigned a place in the reactivity series of metals. Why? **2**

Or

(d) (i) Explain why some metals can displace hydrogen from acids but non-metals cannot.

(ii) Which metals in reactivity series displace hydrogen from water and dilute acids?

38. The figure shown below represents an activity to prove the requirements for photosynthesis. During this activity, two healthy potted plants were kept in the dark for 72 hours. After 72 hours, KOH is kept in the watch glass in setup X and not in setup Y. Both these setups are air tight and have been kept in sunlight for about 6 hours. Then, iodine test is performed with one leaf from each of the two plants X and Y.



- (a) What would be the results of Iodine Test performed on the leaf from plant X and Y respectively? 1
- (b) How do we make the apparatus air tight? 1
- (c) Explain the role of potassium hydroxide in this experiment. 2

Or

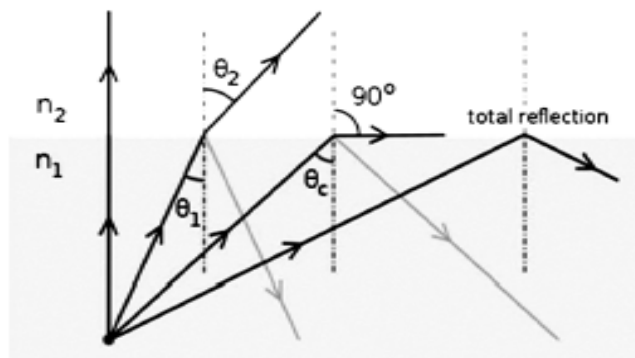
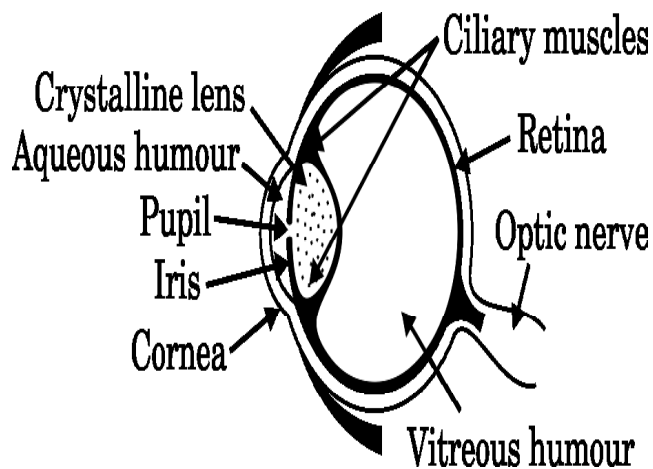
(d) Name the raw materials required and the products formed in the process of photosynthesis. Write a complete equation of the process.

39. Light is a form of energy that produces in us the sensation of sight. Reflection of light is the phenomenon of bouncing back of light in the same medium on striking the surface of any object. The two laws of reflection are the incident ray, the reflected ray and the normal (at the point of incidence), all lie in the same plane and the angle of reflection (r) is always equal to the angle of incidence (i). Refraction of light is the phenomenon of change in the path of light in going from one medium to another.

When a ray of light passes from a medium of water to that of air, it will be refracted at the junction separating the two media. Since the light ray passes from a medium of a higher refractive index to that having a lower refractive index, therefore the refracted light ray bends away from the normal.

At a specific angle of incidence, the incident ray of light is refracted in such a way that it passes along the surface of the water. This particular angle of incidence is called the critical angle. Here the angle of refraction is 90 degrees.

When the angle of incidence is greater than the critical angle, the incident ray is reflected back to the same medium. We call this phenomenon total internal reflection.



Mirage is an optical illusion which is responsible for the appearance of the water layer at short distances in a desert or on the road. Mirage is an example of total internal reflection which occurs due to atmospheric refraction.

- (a) What is mirage? How is it caused? 1
- (b) What is total internal reflection? 1
- (c) State the laws of reflection. 2

Or

(d) State two conditions for total internal reflection.



SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

SECTION : A

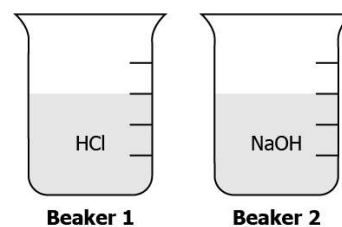
(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. A student placed 10 mL HCl and NaOH in two separate beakers as shown. 1

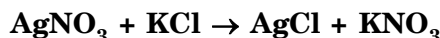
In beaker 1, 4 mL of NaOH is added whereas in beaker 2, 4 mL of HCl is added. The student notes the possible change in pH in both solutions.

Which change in pH is correct?

- (a) pH increases in beaker 1 and beaker 2.
- (b) pH reduces in beaker 1 and increases in beaker 2.
- (c) pH increases in beaker 1 and reduces in beaker 2.
- (d) pH reduces in beaker 1 and beaker 2.



2. The chemical reaction between potassium chloride and silver nitrate is given by the chemical equation.



What can be inferred from the chemical equation? 1

- (a) silver nitrate and potassium undergo a decomposition reaction to form silver chloride and potassium nitrate
- (b) silver nitrate and potassium undergo a displacement reaction to form silver chloride and potassium nitrate
- (c) silver nitrate and potassium undergo a combination reaction to form silver chloride and potassium nitrate
- (d) silver nitrate and potassium undergo double displacement reaction to form silver chloride and potassium nitrate

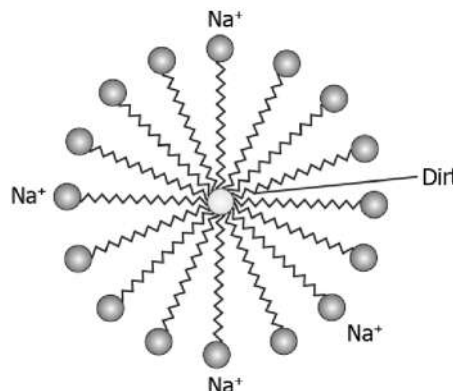
3. Which of the following correctly represents a balanced chemical equation? 1

- (a) $\text{Fe}(s) + 4\text{H}_2\text{O}(g) \rightarrow \text{Fe}_3\text{O}_4(s) + 4\text{H}_2(g)$
- (b) $3\text{Fe}(s) + 4\text{H}_2\text{O}(g) \rightarrow \text{Fe}_3\text{O}_4(s) + 4\text{H}_2(g)$
- (c) $3\text{Fe}(s) + \text{H}_2\text{O}(g) \rightarrow \text{Fe}_3\text{O}_4(s) + \text{H}_2(g)$
- (d) $3\text{Fe}(s) + 4\text{H}_2\text{O}(g) \rightarrow \text{Fe}_3\text{O}_4(s) + \text{H}_2(g)$

4. A student studies that soap solution results in micelle formation which helps to remove dirt. It has a unique orientation which helps in keeping the dirt out of the water as shown in the image.

What helps the dirt to rise away? 1

- (a) suspension of the dirt in the micelles
- (b) a collection of water molecules in the centre of the micelle
- (c) attraction between the ionic end and the dirt to remove it
- (d) mixing of the soap molecules along with the dirt to make it heavier



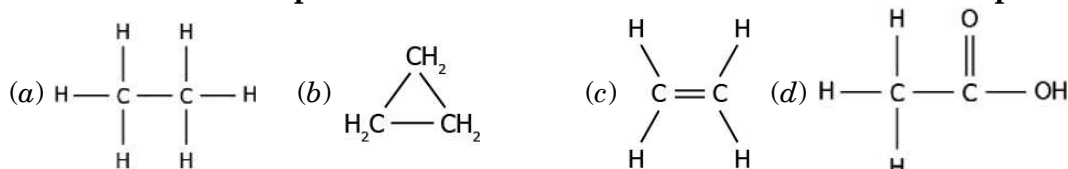
5. Generally, metals are solid in nature. Which one of the following metals is found in liquid state at room temperature? 1

- (a) Na (b) Fe (c) Cr (d) Hg

6. The milkiness (on passing excess carbon-dioxide gas through lime water) disappears due to the formation of: 1

- (a) Calcium carbonate CaCO_3 (b) Calcium hydrogen carbonate CaHCO_3
(c) Calcium oxide CaO (d) Calcium Nitrate $\text{Ca}(\text{NO}_3)_2$

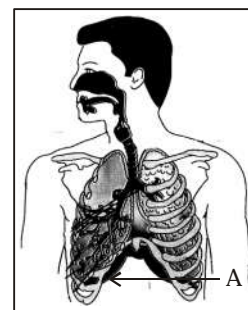
7. Which of these compounds can be classified as an unsaturated compound? 1



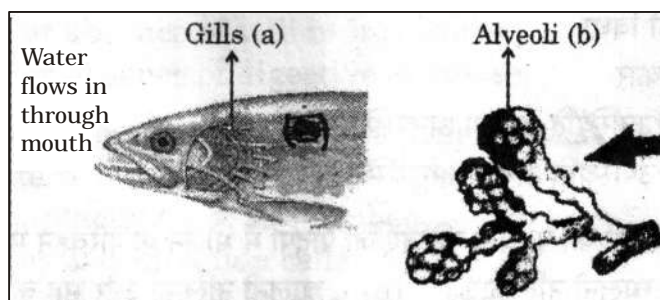
8. Which of the following statements are correct in reference to the role of A (shown in the given diagram) during a breathing cycle in human beings?

- (i) It helps to decrease the residual volume of air in lungs.
(ii) It flattens as we inhale.
(iii) It gets raised as we inhale.
(iv) It helps the chest cavity to become larger.

- (a) (ii) and (iv) (b) (iii) and (iv)
(c) (i) and (ii) (d) (i), (ii) and (iv)



9. Respiratory structures of two different animals — a fish and a human being are as shown. Observe (a) and (b) and select one characteristic that holds true for both of them. 1



- (a) Both are placed internally in the body of animal.
(b) Both have thin and moist surface for gaseous exchange.
(c) Both are poorly supplied with blood vessels to conserve energy.
(d) In both the blood returns to the heart after being oxygenated.

10. In which case does the change in DNA contributes to speciation? 1

- (a) changes in the DNA of zygote
(b) changes in the DNA of brain cells
(c) changes in the DNA of bone cells
(d) changes in the DNA of sperm cells

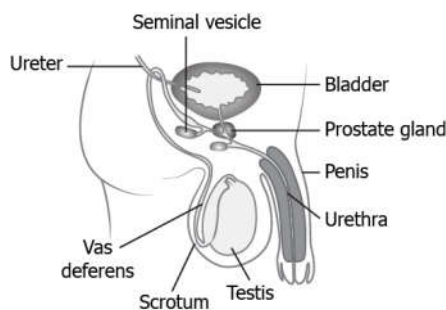
11. What is a likely limitation of electric impulses? 1

- (a) The electric impulses travel slowly between the neurons.
(b) The electric impulses allow signal transmission in multiple directions.
(c) The electric impulses are transmitted to only those body parts that are connected to neurons.
(d) The electric impulses once generated needs to be transmitted quickly within the body.

12. The image shows the male reproductive system.

Which option correctly shows the path that the sperms take when they are released from the body? 1

- (a) testis → ureter → urethra → penis
 (b) testis → vas deferens → ureter → penis
 (c) testis → ureter → vas deferens → penis
 (d) testis → vas deferens → urethra → penis

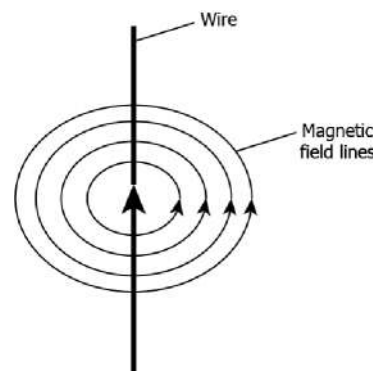
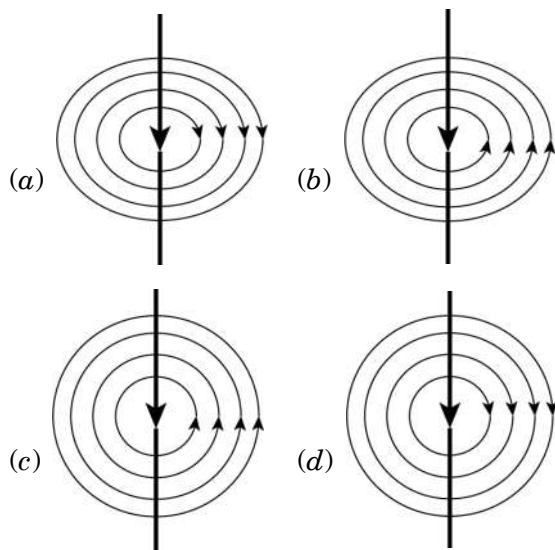


13. A charge of 100 C flows through a bulb in 5 minutes. How much current is flowing through the bulb? 1

- (a) 500 A (b) 100 A (c) 20 A (d) 0.3 A

14. The image shows the magnetic field lines around a straight current carrying conductor.

If the direction of the current in the straight wire is changed, what change in the magnetic field line will be observed? 1



15. In order to move a charge of 3 C between two points on a conducting wire, 12 J of work is done. How much increase or decrease in the voltage will increase the work done on the same amount of charge to 36 J? 1

- (a) - 12 V (b) - 8 V (c) + 8 V (d) + 12 V

16. Which one is correct among the following? 1

- (a) Red insulated wire is called live wire (b) Black insulated wire is called neutral wire
 (c) Green insulated wire is called earthing (d) All of the above

(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is False but R is true

17. **Assertion** : Oxidation occurs with the gain of oxygen atom.

Reason : Reduction occurs with the lost of oxygen atoms

1

- 18. Assertion :** The unicellular organism can take the required substances directly from the environment. **1**
Reason : The whole body of unicellular organisms is in direct contact with environment.
- 19. Assertion :** The ventricles have thicker muscular walls than the atria. **1**
Reason : Ventricles have to pump blood into various organs.
- 20. Assertion :** A strong magnetic field produced inside a solenoid can be used to magnetise a piece of magnetic material. **1**
Reason : The magnetic field is the same at all points inside the solenoid.

SECTION : B*(Q. no. 21 to 26 are very short answer questions.)*

- 21.** Name the gas which is liberated when an acid reacts with a metal. Illustrate with an example. How will you test the presence of this gas ? **2**

Or

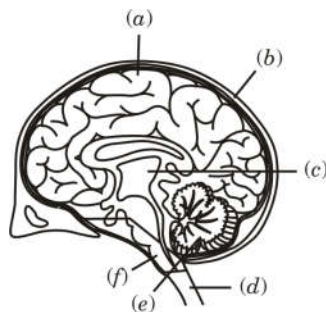
- (a) Which metal from the following can displace zinc from zinc sulphate solution ?

Lead, copper, magnesium, silver.

Write the equation of the chemical reaction involved.

- (b) Arrange metals Ca, Al, Cu and Au in decreasing order of reactivity.

- 22.** Identify the unlabelled parts of brain in the given diagram : **2**



- 23.** State the role of the following in the digestion of food in humans : **2**

(a) Trypsin (b) Lipase (c) Intestinal juice

- 24.** Mention two roles played by the process of transpiration in plants. **2**

- 25.** A converging lens has a focal length of 250 mm. Calculate its power and express it according to sign convention. **2**

Or

- (a) State Snell's law of refraction.

(b) Using Snell's law and with the help of a diagram illustrate the path of a ray of light incident normally from a medium of refractive index n_1 to medium of refractive index n_2 .

- 26.** Write any two differences between bio-degradable and non-biodegradable substances by giving one example of each from our daily life. **2**

SECTION : C*(Q.no. 27 to 33 are short answer questions.)*

- 27.** State three applications of a decomposition reaction. **3**

- 28.** Effervescences are formed when the batter for cake is heated. Which substance is present in batter? Name the gas evolved. Write the chemical equation involved. **3**

- 29.** Describe heterotrophic mode of nutrition and give its examples. Name the three types of this nutrition. **3**

Or

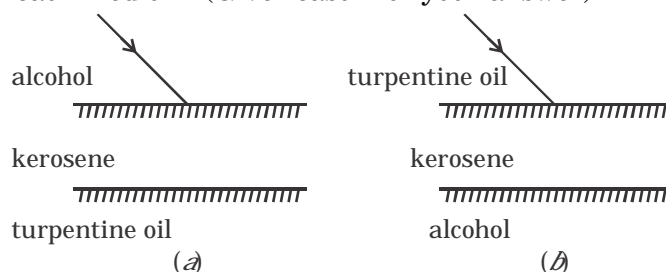
State the function of the following in the alimentary canal :

(i) Liver (ii) Gall bladder (iii) Villi

- 30.** The image of a candle flame placed at a distance of 30 cm from a mirror is formed on a screen placed in front of the mirror at a distance of 60 cm from its pole. What is the nature of the

mirror ? Find its focal length. If the height of the flame is 2.4 cm, find the height of its image. State whether the image formed is erect or inverted. **3**

31. The refractive indices of turpentine oil, kerosene and alcohol are 1.47, 1.44 and 1.36 respectively. On the basis of this information complete the following ray diagram to show the path of ray of light through each medium. (Give reason for your answer) **3**



32. You are given two identical looking iron bars. Just using these two bars how will you identify whether any or both of these bars is/are a magnet ? **3**

Or

Why can't two magnetic field lines cross (intersect) each other ?

33. Accumulation of harmful chemicals in our bodies can be avoided. Explain how this can be achieved. **3**

SECTION : D

(Q.no. 34 to 36 are Long answer questions.)

34. (a) While washing clothes in washing machine the clothes are agitated in soap solution for sometime. Why is this agitation necessary to clean the clothes ?

(b) Why the detergents remain effective in hard water for washing clothes whereas with soap foam is formed with difficulty ? **5**

Or

(i) The cap of plastic bottle shown alongside in the figure is made up of polypropene and the bottle is made of polyethene. Why polyethene and polypropene are not ecofriendly ?



(ii) Differentiate between ethane and ethene.

35. How does small intestine help the digestion of fats, protein and starch ? **5**

Or

State two functions of each of the following in human digestive system :

(i) Saliva, **(ii)** Gastric glands, **(iii)** Pancreas, **(iv)** Large intestine

36. List two special characteristics of a heating element wire. **5**

An electric iron consumes energy at the rate of 880 W when heating is at the maximum rate and 440 W when the heating is at the minimum rate. The applied voltage is 220 V. Calculate the current and resistance in each case.

SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.)

Internal choice is provided in one of these sub-parts.)

37. Oxidation has damaging effect on metals as well as on food. The damaging effect of oxidation on metal is studied as corrosion and that on food is studied as rancidity. The phenomenon due to which metals are slowly eaten away by the reaction of air, water and chemicals present in atmosphere, is called corrosion. For example, iron articles are shiny when new, but get coated with a reddish brown powder when left open for some time. This process is known as rusting of iron. Rancidity is the process of slow oxidation of oil and fat (which are volatile in nature) present in the food materials resulting in the change of smell and taste in them.

(a) Due to slow oxidation of oil and fat, rancidity causes a change in taste and foul smell of food materials. Name two methods to prevent rancidity. 1

(b) Combination of phosphorus and oxygen is an example of oxidation reaction. Write a complete equation of the reaction. 1

(c) Rusting of iron causes a damaging effect on the quality of metal. Write a complete equation to show the process. Name two methods to prevent rusting. 2

Or

(d) What type of chemical reaction is rusting of iron? Explain your answer in brief.

38. In human being, the holozoic nutrition takes place in five steps :

1. **Ingestion** : The process of taking food inside the body is called ingestion.

2. **Digestion** : In digestion the ingested food is converted into simple form with the help of digestive enzymes.

3. **Absorption** : In this stage the food digested in second step is absorbed into the cells of body.

4. **Assimilation** : Assimilation is the process of utilizing the food absorbed in third step by various cells of the body.

5. **Egestion** : Egestion is the final step of holozoic nutrition in which the undigested food is removed from the body.

(a) Name the enzyme present in saliva, also write its action on the food ingested in mouth cavity. 1

(b) The internal wall of small intestine contains long finger like projections, called villi. Write two functions of villi. 1

(c) Name the glands present in the wall of the stomach that release secretions for digestion of food. Write the three components of secretion that are released by these glands. 2

Or

(d) State the role of enzymes (i) trypsin and (ii) lipase, in the process of digestion.

39. Dispersion is the splitting up of white light into seven colors on passing through a transparent medium like a glass prism. When a white light beam is passed through a prism, a band of seven colors are formed is known as spectrum of white light as shown in alongside figure.

When white light consisting of seven colors falls on a transparent medium (glass prism), each color in it is refracted (or deviated) by a different angle, with the result that seven colors are spread out to form a spectrum.

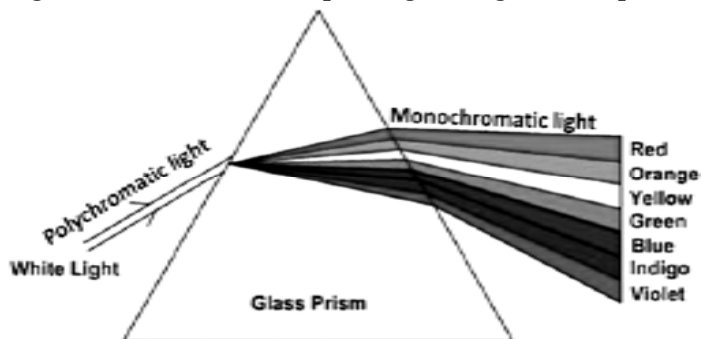
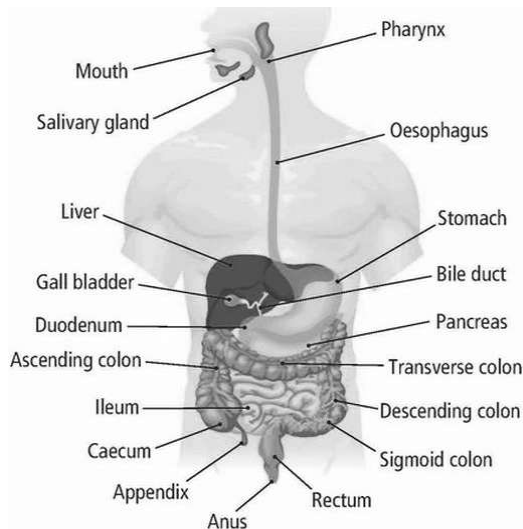
(a) Which colour of light undergoes the least and the most bending on passing through the glass prism? Why? 1

(b) What happens when a beam of white light passes through two prisms placed parallel to each other? 1

(c) How will you differentiate between dispersion and spectrum of light? 2

Or

(d) What is visible spectrum? What is the range of wavelengths of human eye to view different objects?





SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

SECTION : A

(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. An oxide of element P is added to an acid where it forms salt and water. The table shows the possible value of pH and the type of element before the reaction. 1

	pH	Type of element
A	Less than 7	Metal
B	Less than 7	Non-metal
C	Greater than 7	Metal
D	Greater than 7	Non-metal

Which option is correct?

- (a) A (b) B (c) C (d) D

2. In the reaction of iron with copper sulphate solution : $\text{CuSO}_4 + \text{Fe} \rightarrow \text{Cu} + \text{FeSO}_4$

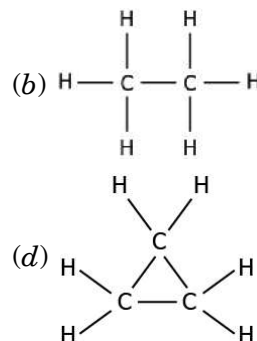
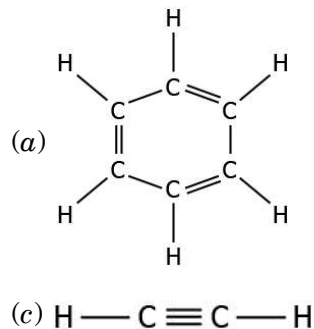
Which option in the given table correctly represents the substance oxidised and the reducing agent? 1

- (a) Substance oxidized—Fe; Reducing agent—Fe
(b) Substance oxidized—Fe; Reducing agent— FeSO_4
(c) Substance oxidized—Cu; Reducing agent—Fe
(d) Substance oxidized— CuSO_4 ; Reducing agent—Fe

3. Why is it important to balance a skeletal chemical equation? 1

- (a) To verify law of conservation of energy.
(b) To verify the law of constant proportion.
(c) To verify the law of conservation of mass.
(d) To verify the law of conservation of momentum.

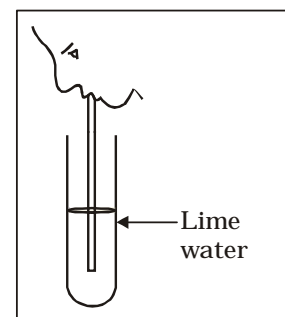
4. Which of these carbon compounds represents an alkene 1



5. Which option gives the process of extraction of mercury from its ore cinnabar? 1
 (a) cooling cinnabar in the presence of excess air
 (b) cooling cinnabar to convert it into mercuric oxide and then heating it
 (c) cinnabar to convert it into mercuric oxide and then heating it again
 (d) cinnabar in the presence of limited air to and then adding a small amount of water
6. A student learns that when sodium chloride reacts with water, it forms sodium hydroxide. Which type of reaction results in the formation of sodium hydroxide? 1
 (a) combination reaction (b) displacement reaction
 (c) neutralization reaction (d) decomposition reaction
7. Which of these series can be classified as homologous series? 1
 (a) CHCl_3 , $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_3\text{H}_7\text{OH}$ (b) CH_3OH , $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_3\text{H}_7\text{OH}$
 (c) CHCl_3 , $\text{C}_4\text{H}_9\text{OH}$, CH_3COOH (d) CH_3COOH , $\text{C}_4\text{H}_9\text{OH}$, $\text{C}_2\text{H}_5\text{OH}$

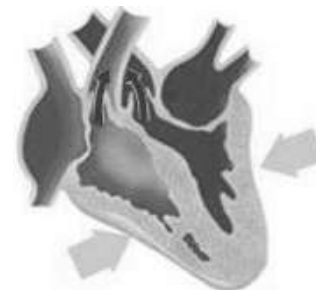
8. Observe the diagram of an activity given alongside. What does it help to conclude, when the person exhales into the test-tube? 1

- (a) Percentage of carbon dioxide is more in inhaled air.
 (b) Fermentation occurs in the presence of oxygen.
 (c) Percentage of carbon dioxide is more in exhaled air.
 (d) Fermentation occurs in the presence of carbon dioxide.



9. Identify the phase of circulation which is represented in the diagram of heart given below. Arrows indicate contraction of the chambers shown. 1

- (a) Blood transferred to the right ventricle and left ventricle simultaneously.
 (b) Blood is transferred to lungs for oxygenation and is pumped into various organs simultaneously.
 (c) Blood transferred to the right auricle and left auricle simultaneously.
 (d) Blood is received from lungs after oxygenation and is received from various organs of the body.



10. The image shows the extent of similarity in the DNA of humans and the organisms.

Organism	Chimp	Mouse	Chicken	Fruit fly
Genetic Similarity with Humans (%)	99.5	88	75	60

Based on the image, what can be inferred about DNA changes in context of speciation? 1

- (a) Newly evolved species have inactive ancestral genes.
 (b) Species retain their DNA and evolve new proteins with time.
 (c) Some of the genes remain conserved during the evolution of species.
 (d) Species undergo a complete change of DNA sequences as they evolve.

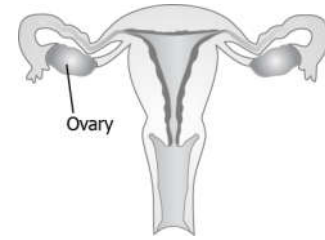
11. A female is suffering from irregular menstrual cycle. The doctor prescribed her some hormonal tablets. Which option shows the hormone she lacks in her body from the endocrine gland? 1

- (a) oestrogen (b) testosterone (c) adrenalin (d) thyroxin

12. The image shows the reproductive organ in females.

1

Which event will likely occur in the ovaries of females after attaining puberty?



- (a) fertilisation
- (b) synthesis of eggs
- (c) production of eggs
- (d) growth and development of embryo

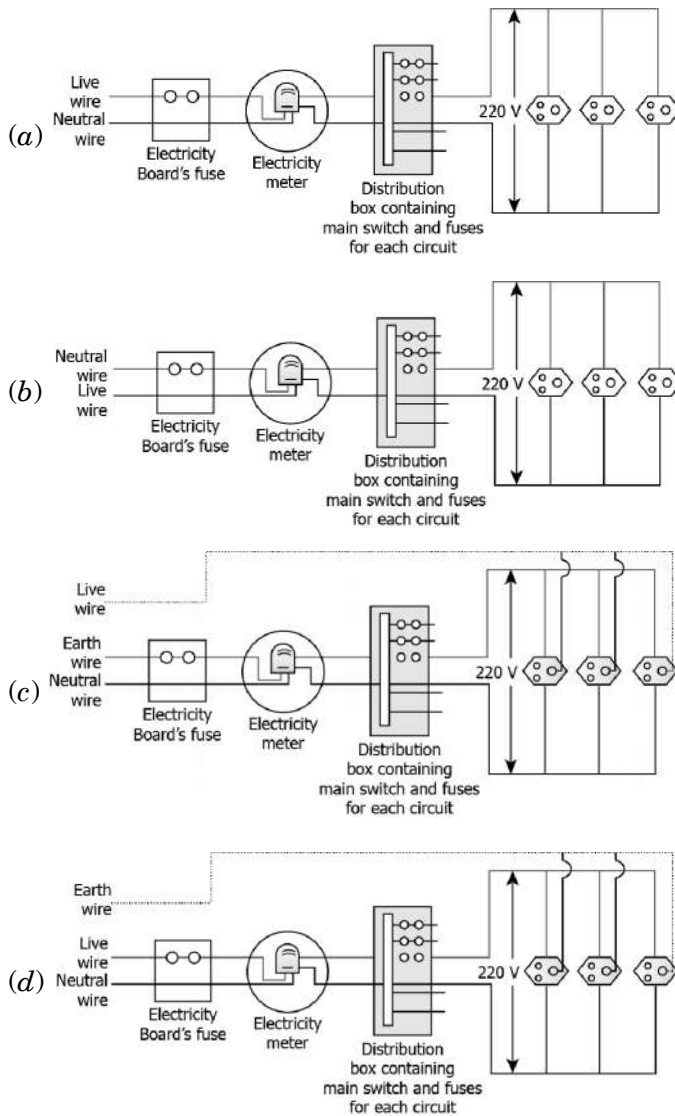
13. Work of 14 J is done to move 2 C charge between two points on a conducting wire. What is the potential difference between the two points ?

1

- (a) 28 V
- (b) 14 V
- (c) 7 V
- (d) 3.5 V

14. Which diagram shows the domestic electric circuit ?

1



15. A conducting wire carries 10^{21} electrons in 4 minutes. What is the current flowing through the wire?

1

- (a) 40 A
- (b) 7 A
- (c) 4 A
- (d) 0.7 A

16. To convert an AC generator into DC generator **1**

- (a) split-ring type commutator must be used
- (b) slip rings and brushes must be used
- (c) a stronger magnetic field has to be used
- (d) a rectangular wire loop has to be used

(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true and R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is False but R is true

17. Assertion : Photosynthesis is an endothermic reaction.

Reason : Energy from sunlight is absorbed in photosynthesis.

18. Assertion : In Hydra, a bud develops as an outgrowth.

Reason : Repeated cell division in Hydra, occurs at multiple sites simultaneously.

19. Assertion : Survival does not demand the excretion of waste products from the body.

Reason : Various chemical reactions taking place inside the body for energy generation create by-products that are harmful.

20. Assertion : The torch gives light only when its switch is on.

Reason : A switch makes a conducting link between the cell and the bulb.

SECTION : B

(Q. no. 21 to 26 are very short answer questions.)

21. Sugandha prepares HCl gas in her school laboratory using certain chemicals. She puts both dry and wet blue litmus papers in contact with the gas.

(i) Name the reagents used by Sugandha to prepare HCl gas.

(ii) State the colour changes observed with the dry and wet blue litmus paper.

(iii) Show the formation of ions when HCl gas combines with water. **2**

Or

Explain why sodium hydroxide solution cannot be kept in aluminium containers? Write equation for the reaction that may take place for the same.

22. Write two differences between the response of the plants and response of the animals to stimuli. **2**

23. Name three life processes which are essential for maintaining life and briefly explain the functioning of any one of them. **2**

24. A variegated leaf with green and yellow patches is used for an experiment to prove that chlorophyll is required for photosynthesis. Before the experiment the green portions (A), and the pale yellow portions (B), are observed. What will be the colour of 'A' just before and after the starch test? Also write the equation of photosynthesis and mark, as well as validate from which molecule the by-product is obtained. **2**

25. Write the rules of the new Cartesian sign conventions for spherical mirrors. **2**

Or

Trace the path of the reflected ray by drawing a figure if it passes from centre of curvature of a concave mirror.

26. Name a physical quantity which circulates through the ecosystem. Mention its direction in an ecosystem in terms of trophic levels. Which trophic level will possess largest amount of this quantity? **2**

SECTION : C**(Q.no. 27 to 33 are short answer questions.)**

- 27.** (a) Write the chemical reaction involved in the process.
 (b) Mention the colour of :
 (i) copper powder, and (ii) the substance formed after burning it.
 (c) How can we reverse the above reaction ?

Write the equation for the reverse reaction and state the substance that undergoes oxidation and the substance that undergoes reduction. **3**

28. A compound 'X' is a constituent of baking powder. It is used as an antacid. When 'X' is heated it gives out a gas 'Y' which when passed through lime water turns it milky and a salt 'Z' is formed which is the main constituent of washing powder. Identify 'X', 'Y' and 'Z'. Write balanced chemical equations for the reactions involved. **3**

29. State the role of the following in the digestion of food in humans : (i) Pancreatic juice, (ii) Gastric juices. **3**

Or

- (a) State two functions of bile juice.
 (b) Differentiate between the functions of enzymes pepsin and trypsin.

30. A student wants to project the image of a candle flame on a screen 90 cm in front of a mirror by keeping the flame at a distance of 15 cm from its pole.

- (a) Suggest the type of mirror he should use.
 (b) Determine the linear magnification in this case.
 (c) Find the distance between the object and its image.
 (d) Draw ray diagram to show the image formation in this case. **3**

31. A convex lens of focal length 25 cm and a concave lens of focal length 10 cm are placed in close contact with each other. Calculate the lens power of combination. **3**

- 32.** (a) Write the properties of magnetic field lines. (any two)
 (b) Give two uses of magnetic compass. **3**

Or

What decides polarity in electromagnet ? How it differs from a permanent magnet ? List the two factors and explain how strength of an electromagnet depends on these.

33. What is an ecosystem ? List its two main components. We do not clean ponds or lakes but an aquarium needs to be cleaned regularly. Why is it so ? Explain. **3**

SECTION : D**(Q.no. 34 to 36 are Long answer questions.)**

- 34.** (i) Write one advantage and disadvantage of using ethanol.
 (ii) State the role of ethanol in the formation of ester. Explain it with the help of a chemical equation.
 (iii) Write the name of the products obtained on burning ethanol in air. Write the chemical equation too. **5**

Or

Mineral acids are used in laboratory but carboxylic acid like vinegar is used as a preservative in pickles.

- (i) Illustrate vinegar as a weak acid and hydro-chloric acid as a strong acid with the help of ionisation equation.
 (ii) Compare vinegar with glacial acetic acid.

- 35.** (a) Differentiate between autotrophic and heterotrophic nutrition.
 (b) Draw a labelled diagram showing cross-section of a leaf and label on it :
 (i) Phloem, (ii) Vascular bundle, (iii) Xylem, (iv) Lamina. **5**

Or

- (i) Describe the role of liver in human beings.
- (ii) What happens to rate of breathing during vigorous exercise and why ?
- (iii) What will happen if mucus is not secreted by gastric glands ?
- (iv) Why are white blood cells called soldiers of the body ?

36. An electric lamp is marked 25 W, 220 V. It is used for 10 hours daily. Calculate :

- (i) its resistance while glowing.
- (ii) energy consumed per day.
- (iii) cost of using it at the rate of ₹ 5 for 30 days.

5

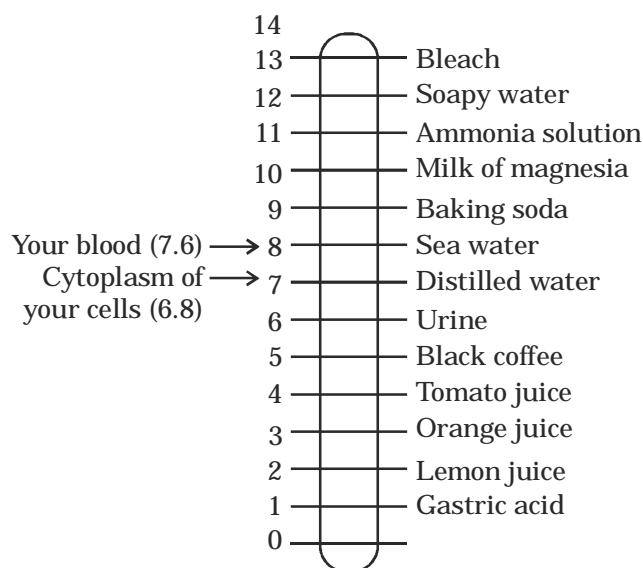
SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.

Internal choice is provided in one of these sub-parts.)

37. The pH scale is used to rank solutions in terms of acidity or basicity (alkalinity). The pH scale is often said to range from 0 to 14, and most solutions do fall within this range. Anything below 7.0 is acidic and anything above 7.0 is alkaline or basic.

The pH inside human cells (6.8) and pH of blood (7.4) are both very close to neutral. Extreme pH values, either above or below 7.0 are usually considered unfavourable for life. However, the medium inside your stomach is highly acidic, with a pH of 1 to 2. Stomach cells, particularly those that come in direct contact with stomach acid and food, are constantly dying and being replaced by new ones. In fact, the lining of the human stomach is completely replaced about every seven to ten days.



(a) Three acidic solutions A, B and C have pH 0, 3 and 5 respectively. Which of these solutions has the highest concentration of H^+ ions? Justify your answer. **1**

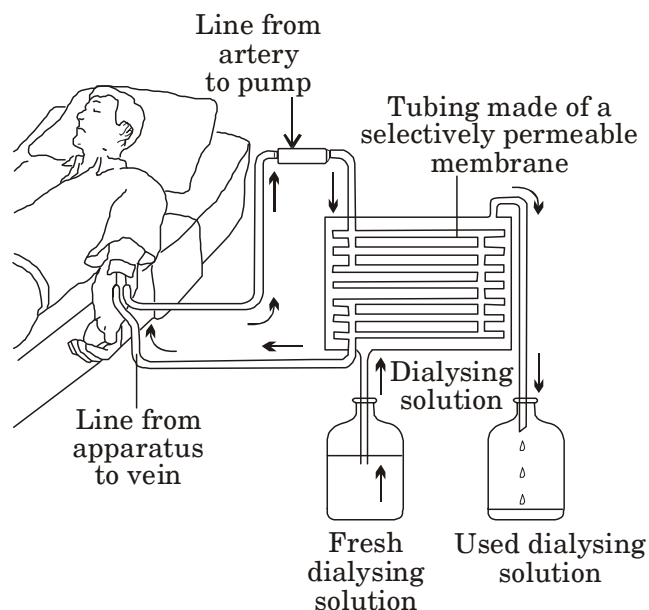
(b) Living organisms can survive in a narrow range of pH change. What is the pH range of our body works within? **1**

(c) The acidity produced due to excess hydrochloric acid in the stomach which causes indigestion, produce pain and irritation. Name an antacid and explain how it works to prevent acidity? **2**

Or

(d) How does the use of toothpaste after eating sweet food, prevent tooth decay?

38. The figure shown below represents a common type of dialysis called as haemodialysis. It is artificial process of filtering the blood by removing the extra waste products from the blood, such as excess salts and urea which are insufficiently removed by the kidney in patients with kidney failure. During the procedure, the patient's blood is cleaned by filtration through haemodialyzer (a series of semi-permeable membranes) before being returned to the blood of the patient. On the basis of this, answer the following questions :

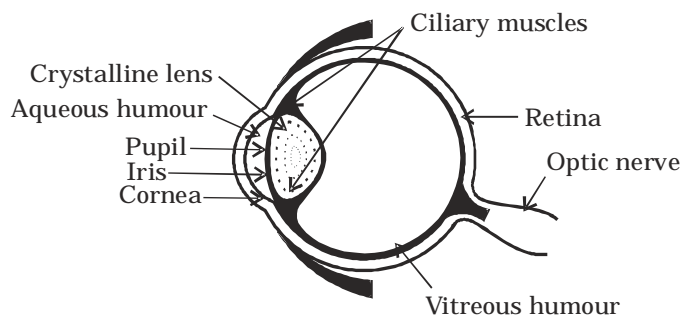


- (a) What is the principal of dialysis? 1
- (b) What is the function of haemodialyzer (artificial-kidney)? 1
- (c) A dialysis machine contains long tubes coiled in a tank containing dialysing solution or dialysate or dialysis solution. Name the substance of which these tubes are made. What are the constituents of dialysate and the main waste which passes into dialysing solution? 2

Or

(d) Who needs dialysis? Why a dialysate is used in dialysing unit? How does it work? Give a function which is not performed by an artificial kidney.

39. The human eye is like a camera. Its lens system forms an image on a light-sensitive screen called the retina. Light enters the eye through a thin membrane called the cornea. The crystalline lens merely provides the finer adjustment of focal length required to focus objects at different distances on the retina. Iris is a dark muscular diaphragm that controls the size of the pupil. The pupil regulates and controls the amount of light entering the eye.



There are mainly three common refractive defects of vision. These are (i) myopia or near-sightedness, (ii) hypermetropia or far-sightedness, and (iii) Presbyopia.

- (a) A student has difficulty in reading the blackboard while sitting in the last row. What could be the defect the child is suffering from? 1
- (b) What is the role of iris and pupil, in human eye? 1
- (c) Which part of eye is donated for eye transplant? Write its important functions? 2

Or

(d) What is hypermetropia? Why is it caused and rectified?



SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

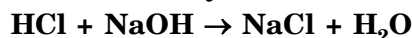
SECTION : A

(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. Which of the following salts do not have the water of crystallisation ? 1
(i) Bleaching power (ii) Plaster of Paris
(iii) Washing soda (iv) Baking soda
(a) (ii) and (iv) (b) (i) and (iii) (c) (ii) and (iii) (d) (i) and (iv)
2. Which of the given options correctly represents the parent acid and base of calcium carbonate ? 1
(a) Parent acid—HCl; Parent base—NaOH
(b) Parent acid—H₂CO₃; Parent base—Ca(OH)₂
(c) Parent acid—H₃PO₃; Parent base—CaSO₄
(d) Parent acid—H₂SO₄; Parent base—CaSO₄
3. A student learns that food companies fill bags of chips with nitrogen gas. What is the purpose packing it with nitrogen? 1
(a) it prevents rancidity of chips
(b) it keeps the mosquitoes away from chips
(c) it keeps the chips dry if the pack falls in water
(d) prevents chips from spilling out when the pack is opened
4. The chemical reaction shows the addition of chlorine gas to hydrocarbon in the presence of sunlight.
$$\text{CHCl}_3 + \text{Cl}_2 \rightarrow \text{CCl}_4 + \text{HCl}$$

How does chlorine react to a hydrocarbon compound in the presence of sunlight? 1
(a) it adds hydrogen into the compound
(b) it adds an oxygen atom into the compound
(c) it substitutes hydrogen atom from the compound
(d) it breaks double and triple bonds into a single bond
5. A researcher conducts an experiment to obtain zinc from its ore. Which option gives the process that the researcher must perform? 1
(a) converting metal sulphides into metallic oxides and then using carbon to reduce it to obtain pure metal
(b) metal oxides into metallic sulphides and then using carbon to reduce it to obtain pure metal
(c) converting metal oxides into metallic carbonates and then using carbon to reduce it to obtain pure metal
(d) metallic sulphides into metallic carbonates and then heating to reduce it to obtain pure metal

6. The equation shows the reaction of hydro-chloric acid with sodium hydroxide.



If the pH of the salt is 7, what are the positive and negative radicals in the salt? 1

- (a) Na — negative radical; Cl — positive radical
 (b) Na — positive radical; Cl — negative radical
 (c) Na — positive radical; Cl — positive radical
 (d) Na — negative radical; Cl — negative radical

7. Which among the following are unsaturated hydrocarbons? 1

- (i) $\text{H}_3\text{C} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ (ii) $\text{H}_3\text{C} - \text{C} \equiv \text{C} - \text{CH}_3$
 (iii) $\text{H}_3\text{C} - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3$ (iv) $\text{H}_3\text{C} - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3$

- (a) (i) and (iii) (b) (ii) and (iii) (c) (ii) and (iv) (d) (iii) and (iv)

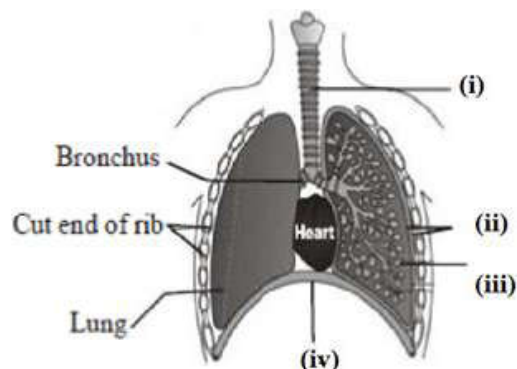
8. Carefully study the diagram of the human respiratory system with labels (i), (ii), (iii) and (iv). Select the option which gives correct identification and main function and/or characteristic. 1

(a) (i) Trachea : It is supported by bony rings for conducting inspired air.

(b) (ii) Ribs : When we breathe out, ribs are lifted.

(c) (iii) Alveoli : Thin-walled sac like structures for exchange of gases.

(d) (iv) Diaphragm : It is pulled up when we breathe in.



9. The image shows the transport of food material inside plant body with the help of phloem.

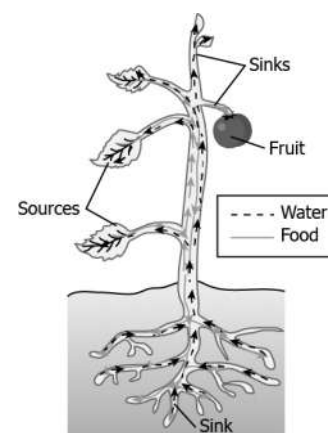
How is food transported from phloem to the tissues according to plants need? 1

(a) food is transported along with the water in plant's body.

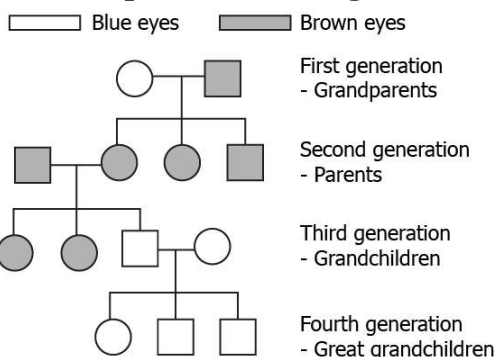
(b) food is transported in only direction like water in the plant body through xylem.

(c) food is transported from a region with low concentration to higher concentration.

(d) Food is transported from a region where it is produced to other parts of the plants.



10. The image shows the traits present across generations of a family.



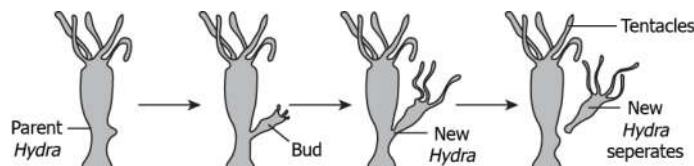
Based on the image, what can be inferred about the eye color trait? 1

- (a) Acquired trait because both male and females have it.
 (b) Acquired trait because it is expressed in all the generations.
 (c) Inherited trait because it is expressed in two different colors.
 (d) Inherited trait because it depends on the traits of preceding generation.

11. A doctor advised a person to take an injection of insulin because 1

- (a) his blood pressure was low (b) his heart was beating slowly
 (c) he was suffering from goitre (d) his sugar level in blood was high

12. The image shows a bud developing on a *Hydra*.



How does the bud develop in the *Hydra*? 1

- (a) bud develops due to separation of body parts of *Hydra*
 (b) bud develops due to repetitive cell division at a specific site
 (c) bud develops due to change in the environmental conditions
 (d) develops due to attachment of another *Hydra* at a specific site

13. A circuit has a charge of 2C moving through it in 3 s. Which electrical component in the circuit, if present, will show the current? 1

- (a) Voltmeter will show a current of 6 A. (b) Ammeter will show a current of 0.7 A.
 (c) Rheostat will show a current of 0.7 A. (d) Resistor will show a current of 0.35 A.

14. A piece of wire is measured to have resistivity in the order of $10^{19} \Omega \text{ m}$. What should its material be classified into? 1

- (a) Alloys (b) Insulators (c) Good conductors (d) Poor conductors

15. While performing the experiment to study the dependence of current on potential difference, if the circuit used to measure the current and voltage is kept in on position for a longer time, then 1

- (a) Voltmeter reading will change (b) Ammeter reading will change
 (c) The resistor will get heated up changing the value of "R"
 (d) All of the above

16. The core of electromagnet is: 1

- (a) Soft iron (b) steel (c) magnesium (d) copper

(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is False but R is true

17. Assertion : A chemical equation must be balanced.

Reason : Law of conservation of mass 1

18. Assertion : If the information in the DNA is changed, different proteins will be made.

Reason : The DNA in the cell nucleus is the information source for making proteins. 1

19. Assertion : The inner lining of the small intestine has numerous finger-like projections called villi.

Reason : The villi are richly supplied with blood vessels. 1

20. Assertion : Positive charge always moves from a higher potential point to a lower potential point.

Reason : Electric potential is a vector quantity. 1

SECTION : B**(Q. no. 21 to 26 are very short answer questions.)**

21. When we over eat we feel burning sensation in the stomach. State reasons. Which substance can be used to nullify its effect ? Give one example. State the property due to which we feel relief. **2**

Or

(i) In nature, metal 'A' is found in free state while metal 'B' is found in the form of its compounds. Which of the two will be nearer to the top of the activity series of metals ? Why ?

(ii) In a solution of silver nitrate, a copper coin was placed. After sometime, silver from the solution was deposited on the copper coin. Which metal is more reactive, copper or silver ? Why ?

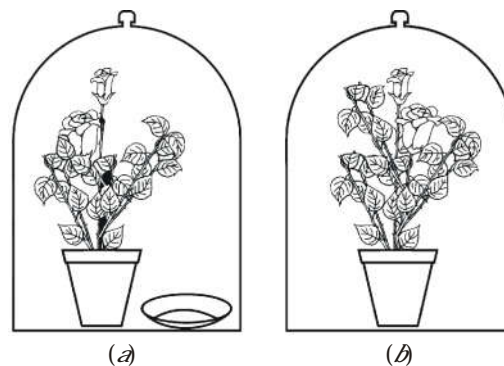
22. How do auxins promote the growth of a tendril around a support ? Describe in brief. **2**

23. Given alongside is the experimental set up to establish that one of the atmospheric gases is essential for photosynthesis in plants.

(i) Name the atmospheric gas which is essential for photosynthesis.

(ii) What is kept in watch glass in figure (a) and why ?

(iii) State the difference in plants in pots (a) and (b) after a few days. **2**



24. Explain two different ways by which living organisms get their food. **2**

25. A student has three concave mirrors A, B and C of focal lengths 20 cm, 15 cm and 10 cm respectively. For each concave mirror he performs the experiment of image formation for three values of object distance of 30 cm, 10 cm and 20 cm.

Giving reason answer the following :

(a) For the three object distances, identify the mirror which will form an image equal in size to that of object. Find at least one value of object distance.

(b) Out of the three mirrors, identify the mirror which would be preferred to be used for shaving purpose. **2**

Or

Write any two differences between concave and convex mirror.

26. Classify the following ecosystems into natural and artificial ecosystem :

Forest ecosystem, aquarium, marine ecosystem and cropland ecosystem. **2**

SECTION : C**(Q.no. 27 to 33 are short answer questions.)**

27. Which two observations will be made when quicklime is added to water ? Mention two uses of the product obtained. **3**

28. How is Plaster of Paris chemically different from gypsum ? How can they be inter-converted ? Write two uses of Plaster of Paris. **3**

29. Explain the significance of photosynthesis. Write the balanced chemical equation involved in the process. **3**

Or

Write the name of the largest gland in human body. Name its secretion and organ where it is stored. Write three functions of the above mentioned gland.

30. An object is placed at a distance of 25 cm away from a converging mirror of focal length 20 cm. Discuss the effect on the nature and position of the image if the position of the object changes from 25 cm to 15 cm. Justify your answer without using mirror formula. **3**

31. (a) With the help of ray diagram explain how a thin paper can be burnt with the help of convex lens during sunny day.

(b) Why the same paper cannot be burnt with the help of a concave lens ? 3

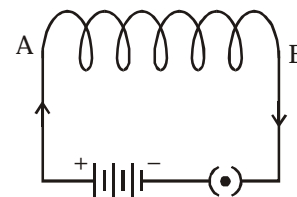
32. Observe the figure given alongside and answer the following questions :

(a) Write the special name given to the coil AB which has many circular turns of insulated copper wire.

(b) State the nature of magnetic field inside AB when a current is passed through it.

(c) Redraw the diagram and sketch the pattern of magnetic field lines through and around AB.

(d) What is the effect of placing an iron core in the coil AB ? 3



Or

(a) What is a solenoid ? Draw the pattern of magnetic field lines around a current carrying solenoid.

(b) What is the pattern of field lines inside a solenoid ? What do they indicate ?

(c) How is the magnetic field produced in a solenoid used ?

33. The environment must not be regarded as a pristine collection of plants and animals. It is a vast and complex entity that offers a range of natural resources to fulfil our requirements.

(a) Explain how should we use them for our material aspirations.

(b) Mention any two values that we would imbibe from doing so. 3

SECTION : D

(Q.no. 34 to 36 are Long answer questions.)

34. (a) How will you show experimentally that metals are good conductors of heat.

(b) Describe the extraction of Mercury metal from its ore Cinnabar (HgS). 5

Or

(a) Ores of both zinc and mercury are sulphide ores. Explain the methods used to extract these metals from their ores.

(b) Can we store concentrated solution of sodium hydroxide in a zinc container ? Explain.

35. Draw a neat diagram of human digestive system. Label all of its parts. 5

Or

Draw a neat diagram of human respiratory system and label the following parts :

- | | | | |
|----------------------|------------|----------------|-------------|
| • Pharynx | • Larynx | • Trachea | • Alveoli |
| • Rings of cartilage | • Bronchi | • Bronchioles | • Diaphragm |
| • Lungs | • Bronchus | • Alveolar sac | |

36. Draw a labelled circuit diagram to study relationship between the current (I) flowing through a conductor and the potential difference (V) applied across its two ends. State the formula correlating the I in a conductor and the V across it. Also show this relationship by drawing a diagram.

What would be the resistance of a resistor if the current flowing through it is 0.15 A when the potential difference across it is 1.05 V ? 5

SECTION : E

(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.)

Internal choice is provided in one of these sub-parts.)

37. A student took a sample of freshly prepared lime water and passed a gas “A” through it. The clear solution becomes cloudy/turpid. This solution was divided into two parts. In the first part, more of gas “A” was passed. In the second part concentrated sulphuric acid was added. A white precipitate was formed in second part.

(a) Write the chemical formula of lime water and the name of gas ‘A’ passed in it. 1

(b) Write the chemical equation for the process in which gas 'A' was passed through lime water for a short duration. 1

(c) What happens when the gas 'A' is passed through ordinary water? Write the chemical equation of the reaction involved. 2

Or

(d) What happens when gas 'A' is passed for longer time through the cloudy/turgid solution? Give chemical equation of the reaction involved.

38. All living cells require energy for various activities. This energy is available by the breakdown of simple carbohydrates either using oxygen or without using oxygen. There are two types of respiration: aerobic and anaerobic. The amount of energy produced in aerobic respiration is much more than that of anaerobic respiration. The energy produced in the process of respiration in all life forms is ATP. Besides energy, different other products are formed in aerobic and anaerobic respiration.

(a) What is cellular respiration? Where does it take place? 1

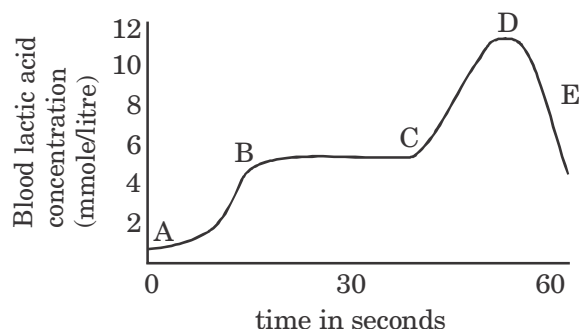
(b) Name the type of anaerobic respiration which takes place in yeasts. Also give the names of products in this respiration. 1

(c) The graph alongside represents the blood lactic acid concentration of an athlete during a race of 400 m and shows a peak at point D.

Lactic acid production has occurred in the athlete while running in the 400 m race. Name the type of respiration in above case. When and where the formation of lactic acid takes place in human body? What are the consequences of formation of lactic acid in human body? 2

Respiration in athletics

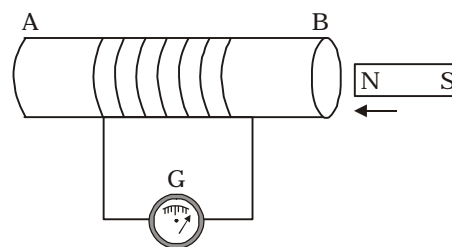
This blood of an athlete was tested before, during and after a 400 m race :



Or

(d) With reference to site, amount of energy produced and the end products formed, differentiate between aerobic and anaerobic respiration.

39. AB is a coil of copper wire having a large number of turns. The ends of the coil are connected with a galvanometer as shown. When the north pole of a strong bar magnet is moved towards the end B of the coil, a deflection is observed in the galvanometer.



(a) State the reason for using galvanometer in the activity. 1

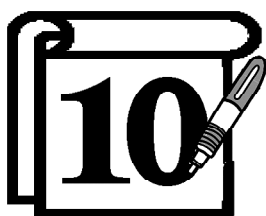
(b) Why does its needle deflect momentarily when magnet is moved towards the coil. 1

(c) What would be observed in the galvanometer in a situation when the coil and the bar magnet both move with the same speed in the same direction? Justify your answer. 2

Or

(d) State the conclusion that can be drawn from this activity.

Will there be any change in the momentary deflection in the galvanometer if number of turns in the coil is increased and a stronger magnet is moved towards the coil?



SAMPLE QUESTION PAPER

SCIENCE

Time Allowed : 3 hours

CLASS-X

Maximum Marks : 80

General Instructions : Same as CBSE Sample Questions Paper-1

SECTION : A

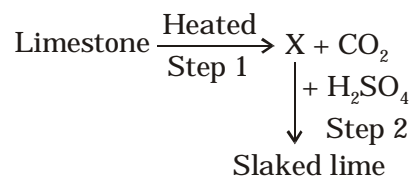
(Select and write one most appropriate option out of the four options given for each of the questions 1-20)

1. A scientist in a chemistry lab wants to make salt of pH 5.5 using acid and base. The table shows the acid and base present in the lab. 1

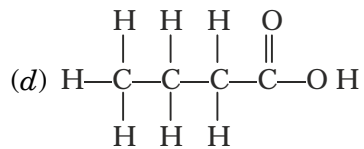
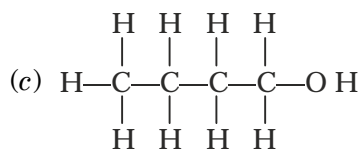
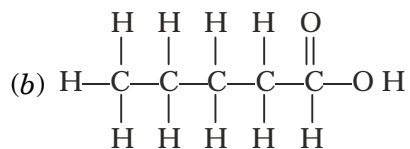
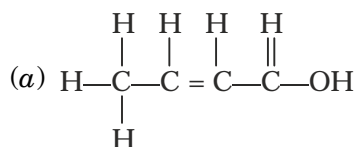
1	2	3	4	5
HCl	NaOH	H ₂ CO ₃	NH ₄ OH	CH ₃ COOH

Which of the acid and base he should use for the reaction?

- (a) HCl and NaOH (b) H₂CO₃ and NaOH
 (c) HCl and NH₄OH (d) CH₃COOH and NaOH
2. Identify the correct option from the given table which represents the type of reactions occurring in step 1 and step 2. 1



- (a) Endothermic — 5 ; Exothermic — 3 (b) Endothermic — 3 ; Exothermic — 5
 (c) Endothermic — 3 ; Exothermic — 3 (d) Endothermic — 5 ; Exothermic — 5
3. A student notices that the bread kept out has a green coloured coating over it after a few days. What explains the reason for the student's observation? 1
- (a) the oils in the bread oxidises and causes rancidity
 (b) bread comes in contact with atmospheric moisture and corrodes
 (c) the oils in the bread reduces and cause the change in the colour of the bread
 (d) comes in contact with the atmospheric nitrogen and a layer deposit over it
4. The correct structural formula of butanoic acid is 1



5. A student notices that the surface of the iron swings in his society playground has turned brown over the years. Which process must be done on the swings to save them from corroding? 1

- (a) putting shades over swings
- (b) swings from the playground
- (c) covering the surface of the swings with paint
- (d) the swings with black paper to protect them from sunlight

6. Vinay observed that the stain of curry on a white shirt becomes reddish-brown when soap is scrubbed on it, but it turns yellow again when the shirt is washed with plenty of water. What might be the reason for his observation?

- (i) Soap is acidic in nature.
- (ii) Soap is basic in nature.
- (iii) Turmeric is a natural indicator which gives reddish tinge in bases.
- (iv) Turmeric is a natural indicator which gives reddish tinge in acids. 1

- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (i) and (iv)
- (d) (ii) and (iv)

7. Which of the following is not a straight chain hydrocarbon? 1



8. Consider the following statements in connection with the functions of the blood vessels marked A and B in the diagram of a human heart as shown. 1

(i) Blood vessel A — It carries carbon dioxide rich blood to the lungs.

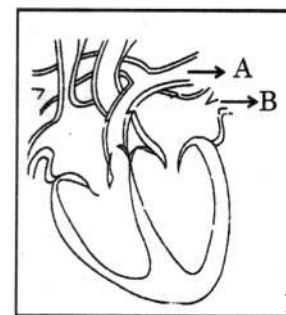
(ii) Blood vessel B — It carries oxygen rich blood from the lungs.

(iii) Blood vessel B — Left atrium relaxes as it receives blood from this blood vessel.

(iv) Blood vessel A — Right atrium has thick muscular wall as it has to pump blood to this blood vessel.

The correct statements are :

- (a) (i) and (ii) only
- (b) (ii) and (iii) only
- (c) (ii), (iii) and (iv)
- (d) (i), (ii) and (iii)



9. Plants use completely different process for excretion as compared to animals. Which one of the following processes is NOT followed by plants for excretion? 1

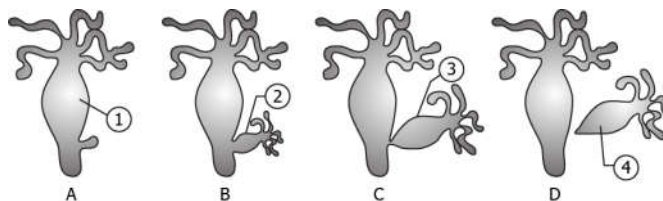
- (a) They can get rid of excess water by transpiration.
- (b) They selectively filter toxic substances through their leaves.
- (c) Waste products are stored as resins and gums in old xylem.
- (d) They excrete waste substances into the soil around them.

10. Two pea plants one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds produce F1 progeny that have round, yellow (RrYy) seeds. When F1 plants are selfed, the F2 progeny will have new combination of characters. Choose the new combination from the following

- (i) Round, yellow
 - (ii) Round, green
 - (iii) Wrinkled, yellow
 - (iv) Wrinkled, green 1
- (a) (i) and (ii)
 - (b) (i) and (iv)
 - (c) (ii) and (iii)
 - (d) (i) and (iii)

11. The hormone which increases the fertility in males is called 1
 (a) oestrogen (b) testosterone (c) insulin (d) growth hormone

12. The model shows the process of budding in *Hydra*.



What is the likely purpose of this division in *Hydra*? 1

- (a) to increase the body size (b) to recover lost body parts
 (c) to induce variation in body (d) to develop new independent individual

13. What is the relationship between resistance and current? 1

- (a) They are directly related to each other.
 (b) They are inversely related to each other.
 (c) The resistance has a greater magnitude than current.
 (d) The current has a greater magnitude than resistance.

14. Which combination of a $2\ \Omega$ resistor and $4\ \Omega$ resistor offers the least resistance to current in the circuit? 1

- (a) Series combination, which results in a net resistance of $2\ \Omega$.
 (b) Parallel combination, which results in a net resistance of $2\ \Omega$.
 (c) Series combination, which results in a net resistance of $1.5\ \Omega$.
 (d) Parallel combination, which results in a net resistance of $0.5\ \Omega$.

15. Which one among a bar of an alloy of mass $2\ \text{kg}$ and a $3\ \text{kg}$ iron bar of same dimension has greater resistivity? 1

- (a) Iron bar because it has higher mass.
 (b) Alloy bar because it has lower mass.
 (c) Iron bar because it has same types of atoms.
 (d) Alloy bar because it has different types of atoms.

16. Strength of the magnetic field at a point in the space surrounding the magnet is measured by 1

- (a) Thickness of the magnet (b) The resistance of it
 (c) The number of lines crossing a given point (d) Length of the magnet

(Q. no 17 to 20 are Assertion–Reasoning based questions.)

These consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is False but R is true

17. **Assertion** : Production of gas is an indication of chemical reaction taking place.

Reason : Gas is produced in any chemical reaction. 1

18. **Assertion** : The experiences of an individual during its lifetime can direct evolution.

Reason : Change in non-reproductive tissues cannot be passed on to the DNA of the germ cells. 1

19. **Assertion** : In human beings, the carbon dioxide rich blood has to reach the lungs.

Reason : The lungs help to remove the carbon dioxide from the body during the process of inhalation. 1

20. **Assertion** : Electric appliances with metallic body have three connections whereas an electric bulb has two pin connection.

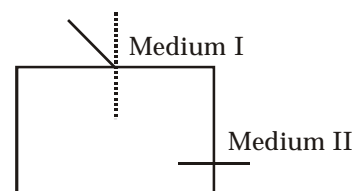
Reason : Three pin connections reduce heating of connecting wires. 1

SECTION : B**(Q. no. 21 to 26 are very short answer questions.)****21.** Define an acid and a base. Name one weak acid and one strong base. **2****Or**

Can we take anode made up of pure metals and cathode made up of impure metal during electro-refining? Justify your answer.

22. You must have noticed that as you approached 10-12 years of age, many dramatic changes appeared in your body. State reason. **2****23.** (i) Name the respiratory pigment found in human beings. **2**(ii) How is carbon dioxide transported in our body? **2****24.** (a) Why cramps are caused in our muscles during sudden activity? **2**(b) Name the type of respiration that takes place in yeast during fermentation. **2****25.** A ray of light enters from medium I into a slab made up of a transparent substance II. Refractive index of medium I and II are 1.65 and 2.42 respectively.

(a) Complete the path of ray of light in medium II.

(b) In the diagram given below which medium is optically more denser? Give reason for your answer. **2****Or**

We wish to obtain an equal sized inverted image of a candle flame on a screen kept at distance of 4 m from the candle flame.

(a) Name the type of lens that should be used.

(b) What should be the focal length of the lens and at what distance from the candle flame the lens be placed?

26. What will happen if all the deers are removed in the given food chain? **2**

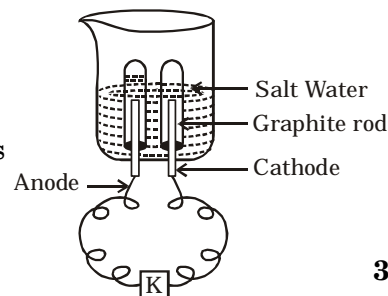
Plants → Deers → Tigers

SECTION : C**(Q.no. 27 to 33 are short answer questions.)****27.** Observe the following diagram and answer the questions that follow :

(i) Identify the gases evolved at anode and cathode.

(ii) Why is the amount of gas collected in the two test tubes are of not the same volume?

(iii) What type of reaction is this?

(iv) Why should we use salt water? **3****28.** Write one point of difference between each of the following :

(a) A hydrated salt and an anhydrous salt.

(b) Washing soda and soda ash.

(c) Baking soda and baking powder. **3****29.** Give reasons for the following :

(a) Herbivores have longer small intestine than carnivores.

(b) Rings of cartilage are present in trachea.

(c) Mucus is secreted along with HCl in the stomach. **3****Or**

Write three points of difference between breathing and respiration.

30. With the help of a ray diagram, state and explain the laws of reflection of light at a plane mirror. Mark the angle of incidence and reflection clearly in the diagram. If the angle of incidence is 32.5° , what will be the angle of reflection? **3****31.** Draw a ray diagram to show the path of the refracted ray in each of the following cases. A ray of light incident on a concave lens is :

- (a) Passing through its optical centre. (b) Parallel to its principal axis.
 (c) Directed towards its principal focus. **3**

32. State whether an alpha particle will experience any force in a magnetic field (if alpha particles are positively charged particles)

- (i) it is placed in the field at rest. (ii) it moves in the magnetic field parallel to field lines.
 (iii) it moves in the magnetic field perpendicular to field lines.

Justify your answer in each case. **3**

Or

List two characteristics of the material to be used in fuse wire. Name the material it is made up of. A fuse is always connected in series in an electric circuit. Justify this statement giving reason.

33. 'Swachha Bharat Abhiyan' is the right step to inculcate environment friendly habits among students as they are the future citizens of India. What can be done at school level to make this mission successful? **3**

SECTION : D

(Q.no. 34 to 36 are Long answer questions.)

34. Give reasons for the following :

(a) Calcium and magnesium are found in the combined form in nature while gold and platinum are found in the free state.

(b) Aluminium vessel loses its shine readily.

(c) Aluminium cannot be obtained by reduction of its oxide with coke.

(d) When a piece of copper metal is added to a solution of zinc sulphate, no change takes place, but the blue colour of copper sulphate fades away when a piece of zinc is placed in its solution. **5**

Or

In what forms are the metals found in nature? With the help of examples explain how metals react with oxygen, water and dilute acids. Also write chemical equations for these reactions.

35. State two different types of movement in plants. Mention two points of difference between them. **5**

Or

(a) Define hormone. Write four characteristics of hormones in humans.

(b) Name the disorder caused by the following situations :

(i) Under secretion of growth hormone (ii) Over secretion of growth hormone

(iii) Under secretion of insulin (iv) Deficiency of iodine

36. (a) Name and state the law that gives relation-ship between the potential difference (V) across the two ends of a conductor and the current (I) flowing through it.

(b) Represent it (Ohm's law) mathematically.

(c) Draw the V-I graph for this (Ohm's) law. **5**

SECTION : E

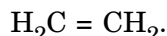
(Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts.

Internal choice is provided in one of these sub-parts.)

37. The compounds entirely consisting of carbons and hydrogen's are known as hydrocarbons. There are different categories in which hydrocarbons are divided out of which the two are :

Saturated hydrocarbons : The hydrocarbons having only single bonds between the carbon atoms are called saturated hydrocarbons. This includes alkanes having a general formula C_nH_{2n+2} . The first member of homologous series of alkanes is methane (CH_4).

Unsaturated hydrocarbons : The hydrocarbons having double and triple bonds between the carbons atoms are called unsaturated hydrocarbons. This includes alkenes and alkynes having general formula C_nH_{2n} and C_nH_{2n+2} respectively. The first member of homologous series of alkenes is ethene (C_2H_4). The structure of ethene is as follows :



(a) Give the name and formula of fourth member of alkenes series of hydrocarbon. **1**

(b) Name the reaction used to convert unsaturated hydrocarbons into saturated hydrocarbons. Also give the name of catalyst used in this conversion reaction. **1**

(c) Name and draw the structure of hydrocarbon with general formula $C_n H_{2n-2}$, where $n = 3$.

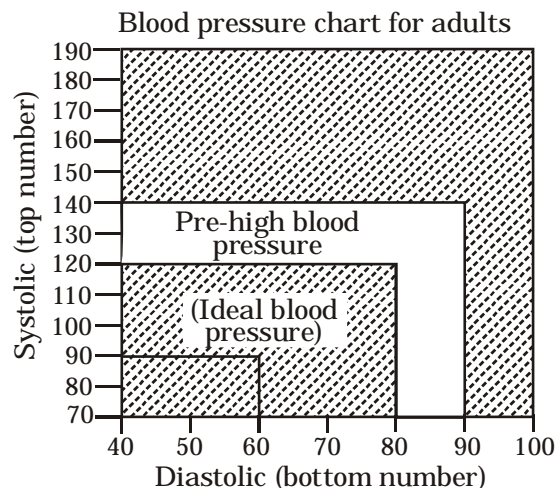
Or

(d) Give a test that can be used to differentiate between saturated and unsaturated hydrocarbons.

38. Use the blood pressure chart given below to see what your blood pressure means. The BP chart is suitable for adults of any age. Blood pressure readings have two numbers, for example 140/90 mm Hg.

The top number is our Systolic blood pressure, (the highest pressure when our heart beats and pushes the blood round our body). The bottom one is our diastolic blood pressure, (the lowest pressure when our heart relaxes between beats). Family history, obesity or over weight, smoking or chewing tobacco, using too much salt or low potassium levels, drinking alcohols, stress and certain chronic conditions like kidney disease and diabetes can lead to high blood pressure.

The blood pressure chart above shows ranges of high, low and healthy blood pressure readings. Regular high blood pressure may lead to headaches, chest pain, irregular heartbeats and even heart attack.

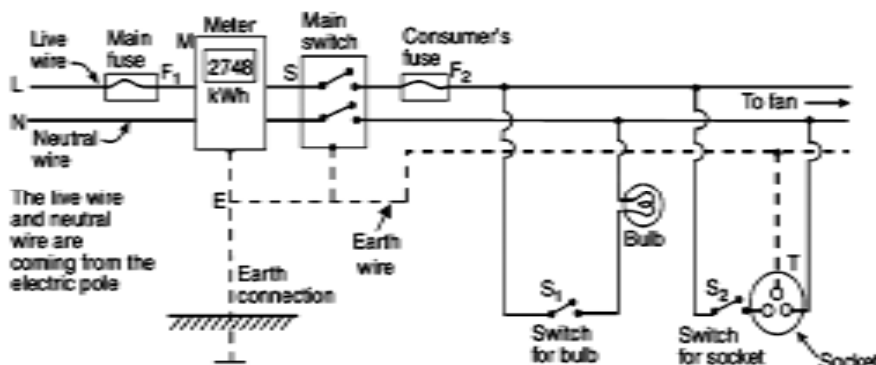


- (a) What is the range of blood pressure in a normal human being? 1
- (b) Name the instrument used to measure the blood pressure. 1
- (c) When the blood pressure is said to be on higher side/elevated? What are the consequences of high blood pressure (hypertension)? 2

Or

(d) Explain in brief, how the high blood pressure cause heart failure?

39. In household electric circuits, the mains supply is delivered to our homes using three core cable as shown here. The cable consists of three wires, live wire, neutral wire and earth wire. The live wire is at potential difference of 220 V for the domestic supply and the potential difference between live and neutral wire is 220 volts. The live wire is connected to electric meter through a fuse or a circuit breaker of higher rating. The neutral wire is connected directly to the electric meter.



- (a) What is an electric fuse? How a fuse is connected with an electric device? 1
- (b) How does a fuse work to protect an electric circuit? 1
- (c) Why do we use parallel combination of connecting electrical appliances in household circuit? 2

Or

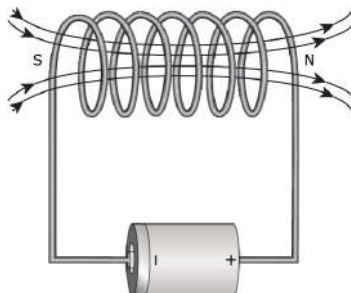
(d) Why we do not use series combination of connecting electric appliances in household circuits?

Answers

Sample Question Paper – 6

1. (a) 2002
2. (c) The reaction is an example of a combination reaction as two compounds react to form a single compound.
3. (c) reaction P is an example of a combination reaction while reaction Q is an example of a decomposition reaction
4. (b) $\text{CH}_3\text{Cl} + \text{HCl}$
5. (c) $\text{Mg}(\text{NO}_3)_2$ and 2H_2
6. (a) by heating the baking soda
7. (b) as it contains two carbon atoms and a single bond connects the carbon atoms
8. (c) $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$
(Glucose)
9. (c) Saliva will breakdown starch into simple sugar molecules.
10. (a) Urey and Miller
11. (b) The plant uses electrical- chemical signals to transfer information from cell to cell.
12. (c) $\text{E} \rightarrow \text{C} \rightarrow \text{B} \rightarrow \text{D} \rightarrow \text{A}$
13. (a) ₹ 20
14. (c) R
15. (b) (i)

16. (c)



17. (b) Both A and R are true and R is not the correct explanation of A

18. (b) Both A and R are true and R is not the correct explanation of A

19. (a) Both A and R are true and R is the correct explanation of A

20. (a) Both A and R are true and R is the correct explanation of A

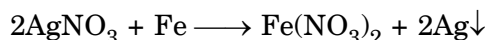
21. • Antacids are mild bases.

• Antacids neutralize the effect of extra acid produced in the stomach during indigestion and thus provide relief.

• **Example** : Magnesium hydroxide, sodium hydrogen carbonate.

Or

No, we cannot place silver nitrate solution in an iron vessel because iron is more reactive than silver. It displaces silver from silver nitrate solution and forms ferrous nitrate.



22. (a) Gustatory — Tongue; Olfactory — Nose.

(b) a = Cell body; b = Axon

23. (a) Photosynthesis occurs only in the cells of plant which possess the green coloured plastids (chloroplasts).

(b) Basic requirements for this process to occur are :

(i) Carbon dioxide (ii) Water (iii) Sunlight (iv) Chlorophyll.

24. (a) **Renal artery** : It carries blood into the kidneys.

(b) **Kidney** : Kidney removes nitrogenous wastes such as urea and uric acid from the blood.

(c) **Ureter** : It connects the kidney with the urinary bladder.

(d) **Urinary bladder** : Urinary bladder stores urine until the pressure of the expanded bladder leads to the urge to pass it out through the urethra.

25. Since power of lens is negative, lens used is concave lens. The person is suffering from myopia and corrected by concave lens.

Or

(a) **Myopia** : It is due to the elongation of the eyeball. This changes the size of the eyeball causing image of a distant object to be formed in front of the retina.

(b) **Hypermetropic eye** : In it the size of the eyeball becomes too small. As a result of this, the image of the nearby object is formed behind the retina.

26. Mobile phones, T.V., keyboard and pendrive are the materials which constitute electronic waste.

27. (a) • Reducing agent (substance oxidised) \rightarrow Al

• Oxidising agent (substance reduced) \rightarrow Mn, MnO_2

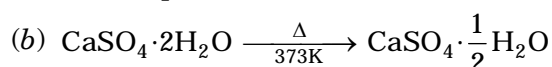
(b) • Reducing agent (substance oxidised) \rightarrow CO

• Oxidising agent (substance reduced) \rightarrow Fe, Fe_2O_3

(c) • Reducing agent (substance oxidised) \rightarrow H_2S

• Oxidising agent (substance reduced) \rightarrow SO_2 , S

28. (a) The compound is Plaster of Paris. Its chemical name is calcium sulphate hemihydrate.



(c) (i) For making toys, materials for decoration.

(ii) For making surfaces smooth.

29. **Nephron** : The filtration units of kidney involved in the removal of nitrogenous wastes from the blood are called nephrons.

• Each nephron has a cup shaped Bowman's capsule.

• Bowman's capsule contains glomerulus, which is a bundle of blood capillaries.

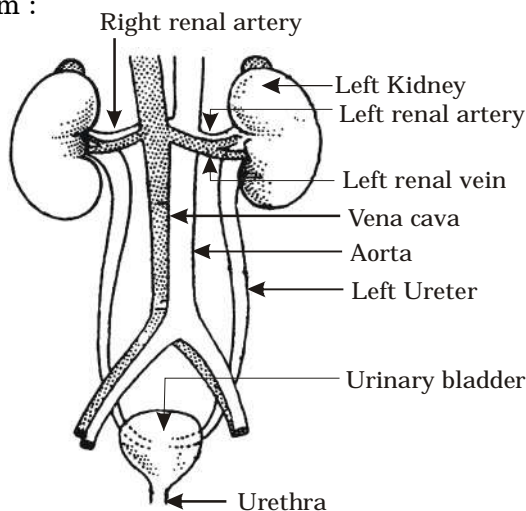
• Glomerulus is involved in filtration of blood.

• All useful products are re-absorbed from the filtrate in the long tube, leaving behind the nitrogenous wastes only.

• This filtrate containing the urea and uric acid is called urine.

Or

Human excretory system :



30. Object-distance, $u = -12$ cm Focal length, $f = 15$ cm

By using mirror formula, $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

$$\frac{1}{15} = \frac{1}{v} + \frac{1}{-12}; \quad \frac{1}{v} = \frac{1}{15} - \frac{1}{12}$$

$$\frac{1}{v} = \frac{4 - 5}{60} \Rightarrow v = -\frac{20}{3} \text{ cm}$$

Image-distance = $\frac{20}{3}$ cm = 6.66 cm

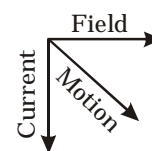
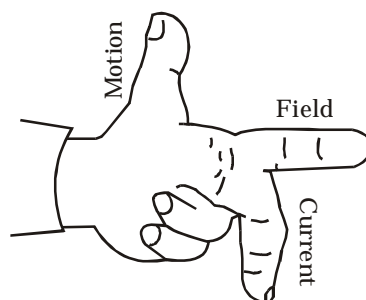
Magnification, $m = -\frac{v}{u} = -\left(\frac{6.66}{-12}\right)$
 $m = 0.55$

As the object is moved farther from the mirror, image gets diminished.

31. If object starts moving from infinity to focus in front of convex mirror, then size of images changes as under :

	Position of object	Position of image	Size of image
1.	At infinity	At F	Very small
2.	Beyond C	Between C and F	Smaller
3.	At C	At C	Equal
4.	Between C and F	Beyond C	Magnified
5.	At F	At infinity	Very large

32. **Fleming's left hand rule :** When we stretch our thumb, forefinger and middle finger so that they are mutually perpendicular to one another, the forefinger points in the direction of the magnetic field and the middle finger points in the direction of the current; the thumb gives the direction of the force acting on the conductor.



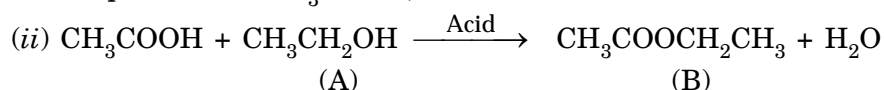
Or

The magnetic field produced by the conductor exerts a force on a magnet placed in the vicinity of the conductor is called magnetic force.

- (i) On doubling the magnitude of current, force does not get affected.
- (ii) Reverse the direction of current flow, the direction of force gets reversed.
- (iii) Reverse the direction of magnetic field, the direction of force gets reversed.

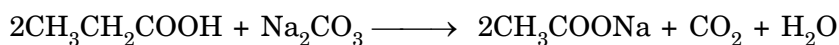
33. Some substances are biodegradable because these substances are broken down into simpler compounds by the action of enzymes secreted by bacteria and other micro-organisms over a period of time. However, some substances are non-biodegradable because they are not broken down by any biological process. They remain inert and persist in the environment for a long period of time.

34. (i) Compound 'A' is CH_3COOH , ethanoic acid or acetic acid.



Compound 'B' is an ester, ethyl ethanoate.

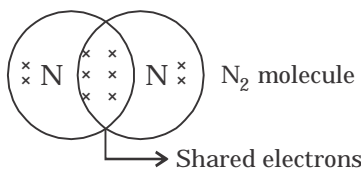
- (iii) Esterification.
- (iv) Carbon dioxide gas (CO_2) is produced.

**Or**

(i) • The bonding formed between two atoms by sharing their valence electrons such that both atoms attain the noble gas configuration is called covalent bonding.

- Triple covalent bond between two nitrogen atoms.

• **Nitrogen Molecule :** $\begin{array}{c} \times \times \\ \times \text{N} \times \\ \times \times \end{array} \quad \begin{array}{c} \times \times \\ \times \text{N} \times \\ \times \times \end{array}$ Nitrogen atoms



$\text{N} \equiv \text{N}$ [Triple bond]

(ii) Number of valence electrons in carbon atom is 4. (Atomic number of carbon atom is 6 and electronic configuration is 2, 4)

So, valency of carbon atom is 4.

35. (a)

Pollination	Germination
(i) The process in which the pollen grains from stamen are transferred to the stigma of pistil.	(i) It is the process in which a tiny seed gives rise to a future plant in the form of radicle and plumule.
(ii) External agents like air, water or an animal are required.	(ii) Generally it takes place in the soil under appropriate conditions.
(iii) After pollination the pollen tube is produced which contains male germ cell.	(iii) After germination the plumule (future stem) and radicle (future root) are developed.

(b) Air, water, insects or any other animal.

(Any two points)

Or

(a)

Pollen grain	Sperm
(i) The male gamete of plants.	(i) The male gamete of animals.
(ii) The shape and size may vary.	(ii) The shape and size fixed.
(iii) It is not motile yet may have wings, etc.	(iii) It is motile and have a tail.

(b)

Ovule	Egg
(i) It is the structure in a plant that develops into a seed after fertilisation. (ii) The ovule carries the egg.	(i) It is a spherical body that houses the embryo during its development. (ii) The egg reproduces the seed.

(c)

Pollen tube	Fallopian tube
(i) It is the tubular structure, which is developed by pollen germination and passes through style to provide a passage for transfer of male gametes from pollen grain to ovary.	(i) It is the tubular structure, which provides a passage for transfer of female gamete (the egg) produced from ovary to uterus.

36. (a) (i) Tungsten is used in making the filament of an electric bulb because :

- Tungsten has high melting point.
- Tungsten has high resistivity to retain much heat.

(ii) Copper and aluminium have low resistivity and they are good conductors of electricity. So, they are used for transmission of electric current.

(b) A parallel combination XY of three resistors having resistances R_1 , R_2 and R_3 respectively is made. It is connected with a battery, a plug key and an ammeter as shown in the figure. Then a voltmeter is connected with the resistor R_1 in parallel and the potential difference is noted down.

The key is switched off, and similarly potential difference across resistors R_2 and R_3 are also noted down.

It is observed that the potential difference across all the three resistors are the same.

37. (a) Since copper lies below hydrogen in the reactivity series therefore copper cannot displace hydrogen from water and no reaction will take place between copper and water and it will stay as it is.

(b) Mg and Mn

(c) Hydrogen occupies position in reactivity series of metals because it has one electron in its valence shell that shows its resemblance with alkali metals (electropositive metals) (lose an electron and become H^+). It also resembles with non-metals which are electronegative (gain of electron and become H^-)

Or

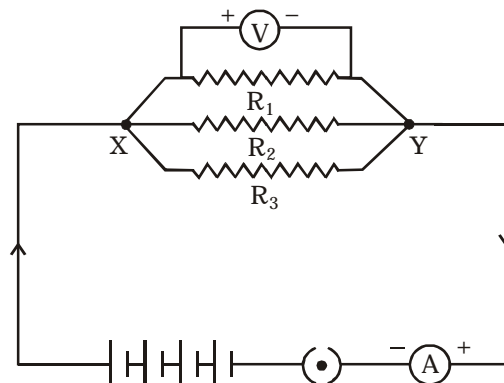
(d) (i) Metals are electron donors hence they can displace hydrogen from acids but non-metals, which are electron acceptors cannot displace hydrogen.

(ii) Metals above hydrogen may displace hydrogen from water and dilute acids, but the metals below hydrogen cannot displace hydrogen.

38. (a) The leaf of plant Y would be changed into blue-black colour but on the leaf of plant X no change in colour would take place.

(b) We make the apparatus air tight by applying vaseline to seal the bottom of jar.

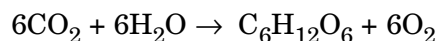
(c) Potassium hydroxide absorbs all the available carbon dioxide in the bell jar. As the jar is closed completely, no CO_2 from outside is allowed to enter inside the jar. In this situation, photosynthesis and production of starch or glucose are inhibited.



Or

(d) Raw material required — Carbon dioxide and water in presence of chlorophyll and sunlight.

Products formed — Glucose and oxygen



39. (a) Mirage is an optical illusion which is responsible for the appearance of the water layer at short distances in a desert or on the road. Mirage occurs due to total internal reflection.

(b) When the angle of incidence is greater than the critical angle, the incident ray is reflected back to the medium. This phenomenon is known as total internal reflection.

(c) (i) The incident ray, reflected ray and the normal (at the point of incidence), all lie in the same plane.

(ii) The angle of reflection (r) is always equal to the angle of incidence (i).

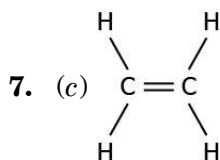
Or

(d) Total internal reflection takes place only when (i) a ray of light travels from an optically denser medium to an optically rarer medium and (ii) angle of incidence is greater than critical angle.

Sample Question Paper – 7

1. (c) pH increases in beaker 1 and reduces in beaker 2.
 2. (d) silver nitrate and potassium undergo double displacement reaction to form silver chloride and potassium nitrate

3. (b) $3\text{Fe}(s) + 4\text{H}_2\text{O}(g) \rightarrow \text{Fe}_3\text{O}_4(s) + 4\text{H}_2(g)$ 4. (a) suspension of the dirt in the micelles
 5. (d) Hg 6. (b) Calcium hydrogen carbonate CaHCO_3

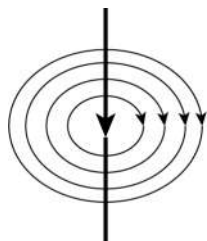


8. (a) (ii) and (iv)

9. (b) Both have thin and moist surface for gaseous exchange.
 10. (d) changes in the DNA of sperm cells
 11. (c) The electric impulses are transmitted to only those body parts that are connected to neurons.
 12. (d) testis → vas deferens → urethra → penis

13. (c) 20 A

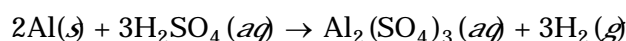
14. (a)



15. (c) + 8 V

16. (d) All of the above

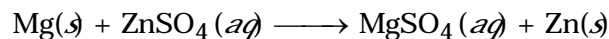
17. (a) Both A and R are true and R is the correct explanation of A
 18. (a) Both A and R are true and R is the correct explanation of A
 19. (a) Both A and R are true and R is the correct explanation of A
 20. (b) Both A and R are true and R is not the correct explanation of A
 21. When dil. sulphuric acid reacts with metal, metal salt and hydrogen gas are produced. For example, when H_2SO_4 reacts with aluminium metal, aluminium sulphate and hydrogen gas are produced.



Test for H₂ : When a burning matchstick or splinter is taken near the mouth of the container in which hydrogen gas is producing, it burns with pop sound.

Or

(a) Magnesium



(b) Ca > Al > Cu > Au.

22. (a) Cerebrum

(b) Cranium (skull)

(c) Mid brain

(d) Spinal cord

(e) Cerebellum

(f) Medulla

23. (a) **Trypsin** : It is secreted by pancreas and acts upon protein in the alkaline medium.

(b) **Lipase** : It helps in breaking down of lipids.

(c) **Intestinal juice** : The enzymes present in it finally convert the protein into amino acids, carbohydrates into glucose and fats into fatty acids and glycerol and nucleic acids into nucleotides.

24. • Transpiration helps in the absorption and upward movement of water and minerals dissolves in it from roots to the leaves.

• It helps in temperature regulation.

25. Focal length of lens = 250 mm = 0.25 m.

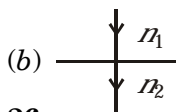
$$\text{Power of lens} = \frac{1}{0.25 \text{ m}} = +4 \text{ D}$$

Since it is a converging lens, so power of lens will be positive.

Power = +4 D.

Or

(a) **Snell's law** : If the light ray incident obliquely on the interface surface of the optical media then the ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for the given pair of media.

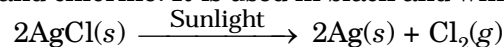


26.

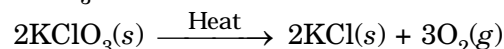
Biodegradable substances	Non-biodegradable substances
(a) Substances that can be broken down by biological processes into simple substances.	(a) They cannot be broken down by biological processes into simple substances.
(b) They do not cause environmental pollution. <i>Example</i> : Paper, cotton clothes, vegetable peels etc.	(b) They cause environmental pollution. <i>Example</i> : Plastic, glass, DDT etc.

27. Applications of a decomposition reaction :

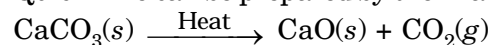
(a) White silver chloride turns grey in sunlight due to the decomposition of silver chloride into silver and chlorine. It is used in black and white photography.



(b) KClO₃ decomposes on heating and oxygen gas is prepared.



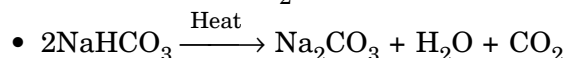
(c) Quick lime can be prepared by thermal decomposition of calcium carbonate (lime stone).



CaO is used to prepare slaked lime which is used in white-washing.

28. • The substance present is baking soda (NaHCO₃).

• Gas evolved is CO₂.



29. The organisms which depend on other organisms for their food are called heterotrophs. Animals and fungi are heterotrophs.

Types : (i) **Saprophytic nutrition :** Some organisms break down the food material outside the body and then absorb it. *e.g.*, fungi like bread mould, yeast and mushrooms.

(ii) **Holozoic nutrition :** Some organisms take in whole material and break it down inside their bodies. *e.g.*, animals including human.

(iii) **Parasitic nutrition :** Some other organisms derive nutrition from plants or animals without killing them. *e.g.*, *Cuscuta (amarbel)*, ticks, lice, leeches and tape worms.

Or

(i) **Liver :** • It secretes bile juice.

• Bile salts break down the large globules of fats into smaller globules to increase the efficiency of enzyme action.

(ii) **Gall bladder :** • It stores the bile secreted by the liver.

• The bile from gall bladder is transported to small intestine through bile duct.

(iii) **Villi :** (a) Numerous finger like projections found in the inner wall of small intestine.

(b) They greatly increase the absorptive surface area of the inner lining of the intestine for the absorption of digested food.

30. Object-distance, $u = -30$ cm

Image-distance, $v = -60$ cm

From mirror formula, $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

$$\frac{1}{f} = \left(\frac{-1}{60}\right) + \left(\frac{-1}{30}\right) = \frac{-1}{60} - \frac{1}{30} = \frac{-1-2}{60} = \frac{-3}{60} \text{ cm}$$

$$f = -20 \text{ cm}$$

∴ It is the concave mirror as f is negative.

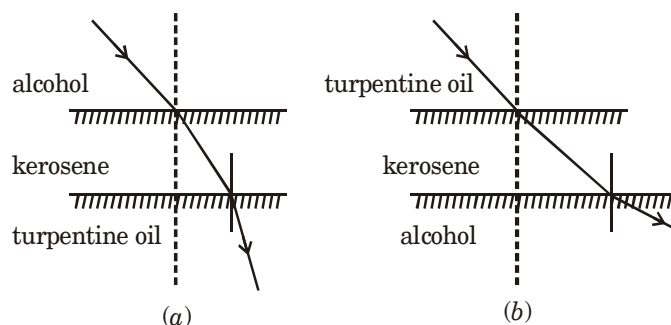
Magnification, $m = \frac{\text{height of the image}}{\text{height of the flame}} = \frac{-v}{u}$.

$$\frac{\text{height of the image}}{2.4 \text{ cm}} = -\left(\frac{-60}{-30}\right)$$

Height of the image = $-2 \times 2.4 \text{ cm} = -4.8 \text{ cm}$

∴ Image formed is real and inverted.

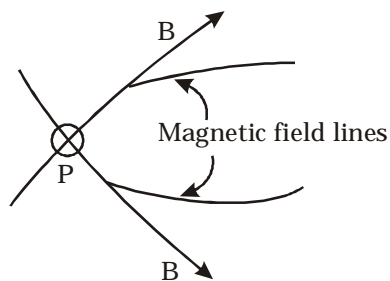
31.



• When the light ray travels from rarer to denser medium, it bends towards normal but when light travels from denser to rarer, it bends away from normal.

• Denser medium has higher value of refractive index.

32. Repeatedly tap one of the bars. If it is the iron bar nothing much will change. If it is the magnet bar, it will demagnetize a bit reducing the force between the two bars. If you get no effect after many taps, you could switch to trying the other just to make sure that you get some effect one way or the other.



Or

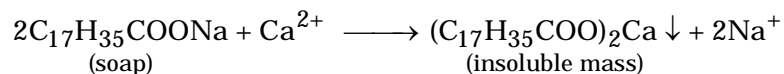
If two field lines intersect each other, at the point of intersection, two tangents with showing two directions of the magnetic field can be drawn. This is not possible.

33. Accumulation of harmful chemicals in our body can be avoided by taking the following steps :

- (i) Before use, wash vegetables and fruits properly with water.
- (ii) Soak vegetables and fruits in salt water for a few minutes before cooking.
- (iii) Most vegetables should be boiled.
- (iv) 'Organic manures' should be used for cultivation.

34. (a) While washing clothes in washing machine the clothes are agitated in soap solution for sometime because the soap micelles formed by soap entrap dirt and greese particles and lie on the surface of the clothes, these micelles get detached from the surface of the clothes and go into water.

(b) Hardness of water is due to the presence of calcium or magnesium salts soluble in water. Soaps which are sodium or potassium salts of higher fatty acids form insoluble substance (scum) with calcium or magnesium ions so foam is formed with difficulty.



Whereas detergents which are ammonium or sulphonate salts of long chain carboxylic acids, do not form insoluble precipitates with the calcium and magnesium ions in hard water so remain effective in hard water for washing clothes.

Or

(i) Polypropene is harder than polyethene so cap of plastic bottle is made up of it while bottle is soft polymer of polyethene. Both polyethene and polypropene are non-biodegradable; cannot be decomposed by the action of microorganisms easily so pollute the environment.

(ii)

Ethane	Ethene
(a) C ₂ H ₆ is a saturated hydrocarbon.	(a) C ₂ H ₄ is an unsaturated hydrocarbon.
(b) Ethane does not decolourise bromine water.	(b) On passing ethene in Br ₂ -water, its brown colour decolorises.
(c) No change in pink colour of alkaline KMnO ₄ , by passing ethane gas.	(c) Colour of alkaline KMnO ₄ , decolorises on passing ethene in it.
(d) Shows substitution reactions, mostly.	(d) Addition reactions are shown by it.

35. (a) Small intestine is the longest part of the alimentary canal.

(b) It is the site of complete digestion of carbohydrates, proteins and fats.

(c) The secretions of liver and pancreas are released in this part.

(d) Bile juice, a secretion of liver, helps to change the acidic nature of food into alkaline, which is essential for the action of pancreatic enzymes.

(e) Bile salts break down the large globules of fats into smaller globules, increasing the efficiency of enzyme action.

(f) Pancreatic lipase helps in breakdown of fats and converts them into fatty acids and glycerol.

(g) Trypsin helps in digestion of proteins.

(h) Pancreatic amylase catalyses break down of starch.

(i) The enzymes present in intestinal juice converts the protein, carbohydrate and fats into their last products, *i.e.*, amino acids, glucose and fatty acids and glycerol respectively.

Or

(i) **Saliva** : (a) It contains an enzyme called salivary amylase which breaks down the starch into sugar.

(b) It helps in the lubrication of food which aids digestion.

(ii) **Gastric glands** : (a) They secrete HCl, pepsin and mucus.

(b) Hydrochloric acid makes the medium acidic which is necessary for the action of the enzyme pepsin.

(c) Pepsin helps in the digestion of proteins.

(d) Mucus protects the inner lining of the stomach from the action of acid.

(iii) **Pancreas** : (a) It secretes pancreatic juice which contains the enzyme trypsin for digesting proteins.

(b) It also contains the enzyme lipase for breaking down emulsified fats.

(iv) **Large Intestine** : (a) The walls of large intestine absorb water from the undigested food.

(b) The remaining undigested food is stored temporarily in rectum and thrown out of the body through anus.

36. Two characteristics are : • It must not melt at high temperature. • It has high resistivity.

Maximum power, $P_{\max.} = 880 \text{ W}$

Minimum power, $P_{\min.} = 440 \text{ W}$

Voltage, $V = 220 \text{ V}$

Current, $I = ?$

Resistance, $R = ?$

$$P_{\max.} = VI$$

$$880 = 220 \times I$$

$$I = \frac{880}{220} = 4\text{A}$$

$$V = IR$$

$$220 = 4 \times R$$

$$R = \frac{220}{4} = 55 \ \Omega$$

$$P_{\min.} = VI$$

$$440 = 220 \times I$$

$$I = \frac{440}{220} = 2\text{A}$$

$$V = IR$$

$$220 = 2 \times R$$

$$R = \frac{220}{2} = 110 \ \Omega$$

37. (a) (i) By adding antioxidants (ii) By packaging in inert gas like nitrogen (iii) Vacuum packaging (iv) Refrigeration (any two)

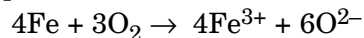
(b) $4\text{P} + 3\text{O}_2 \rightarrow 2\text{P}_2\text{O}_3$ **Or** $4\text{P} + 5\text{O}_2 \rightarrow 2\text{P}_2\text{O}_5$

(c) $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$ $\rightarrow 4\text{Fe}(\text{OH})_3$, By making an alloy, galvanization, electroplating,

lubricating (applying grease or oil on the surface), painting the surface and proper storage of metal objects (any two)

Or

(d) Rusting of iron is a redox (oxidation-reduction reaction) reaction. In oxidation reaction, the oxygen acts as an oxidising agent. The oxygen is also used to get combined with the metal iron, and it is a process of the reduction reaction, and the metal iron behaves as a reducing agent.



38. (a) Salivary amylase, Acts on starch and breaks down into sugars (maltose).

(b) The villi greatly increase the absorptive surface area of the inner lining of small intestine. which helps in rapid absorption of digested food.

(c) Stomach's muscular wall contains gastric glands. These glands secrete gastric juices which contain dilute hydrochloric acid, mucus and two protein digesting enzymes rennin and pepsin.

Or

(d) (i) Enzyme trypsin: This enzyme is produced by the pancreas in an inactive form called trypsinogen. Trypsin converts remaining proteins into peptones and the peptones into peptides and amino acids.

(ii) Enzyme lipase: It is secreted by pancreas and small intestine. Lipase converts fats into fatty acids and glycerol.

39. (a) The violet colour of light has the highest frequency, therefore its bending/refraction is the maximum. The red colour of light has the lowest frequency, therefore its deviation/refraction is the least.

(b) When the white light passes through the first prism, it disperses into its constituent colours. Then these rays pass through the second prism and combine into white light.

(c) Dispersion is the phenomenon of splitting of white light into seven constituent colours on passing through a transparent medium like a glass prism.

Spectrum is a band of seven constituent colours of white light obtained on passing through a transparent medium like a glass prism.

Or

(d) The visible spectrum is the portion of electromagnetic spectrum which is visible to the human eye.

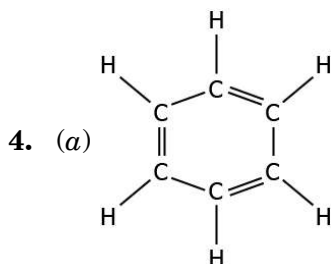
A typical human eye can respond to wavelengths from about 380 to about 750 nm (nanometers), (rounded off to 400 to 700 nm).

Sample Question Paper – 8

1. (a) A

2. (a) Substance oxidized—Fe; Reducing agent—Fe

3. (c) To verify the law of conservation of mass.



5. (c) cinnabar to convert it into mercuric oxide and then heating it again

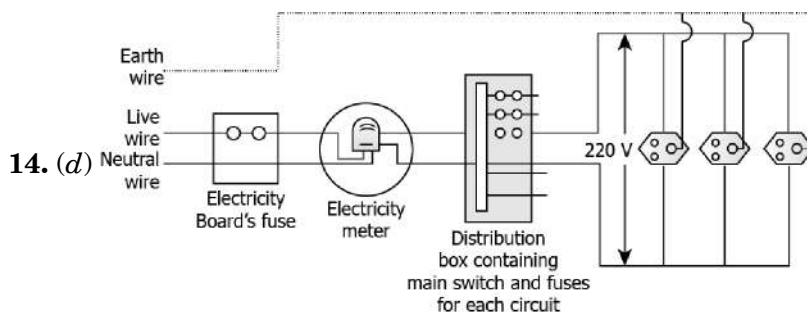
6. (d) decomposition reaction

7. (b) CH_3OH , $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_3\text{H}_7\text{OH}$

8. (c) Percentage of carbon dioxide is more in exhaled air.
 9. (b) Blood is transferred to lungs for oxygenation and is pumped into various organs simultaneously.
 10. (c) Some of the genes remain conserved during the evolution of species.
 11. (a) oestrogen

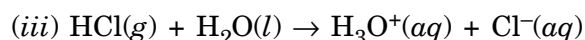
12. (c) production of eggs

13. (c) 7 V



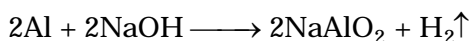
15. (d) 0.7 A

16. (a) split-ring type commutator must be used
 17. (a) Both A and R are true and R is the correct explanation of A
 18. (c) A is true but R is false
 19. (d) A is False but R is true
 20. (a) Both A and R are true and R is the correct explanation of A
 21. (i) The reagents used by Sugandha to prepare HCl gas are sodium chloride and conc. sulphuric acid.
 (ii) There is no colour change observed with dry litmus paper. However, wet blue litmus paper turns red.



Or

Aluminium is an amphoteric metal. It reacts with NaOH to form NaAlO₂. So, NaOH cannot be stored in an aluminium container.



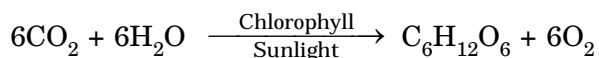
22. • There are no specialised tissue in plants to conduct the information.
 • Presence of specialised protein in animal muscle cells allow it to change shape whereas plant cells change shape by changing the amount of water in them.

23. (a) Nutrition (b) Respiration (c) Excretion (d) Transportation (Any three points)

Nutrition : It is a process of obtaining and utilising the food (nutrients), which is the source of energy. The food is needed for growth, development and maintenance of life.

24. Pale yellow before experiment

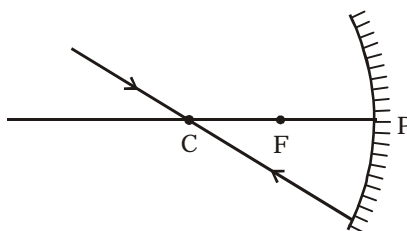
Blue-black after the experiment



O₂ is obtained from water (H₂O), as splitting of water result in formation of hydrogen (used for making glucose) and oxygen (by product).

25. • The object is always placed to the left of mirror. This implies that the light from the object falls on the mirror from the left-hand side.

- All distances are measured parallel to the principal axis and from the pole of the mirror.
- The distances measured above the principal axis are taken as +ve but the distance measured below the principal axis are taken as -ve.
- All the distances measured to right of pole are taken as positive while those measured to the left of pole are taken as negative.

Or

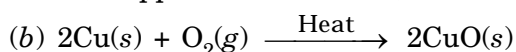
Ray of light follows same path after reflection when it passes through centre of curvature as $i = r = 0$.

26. • Energy.

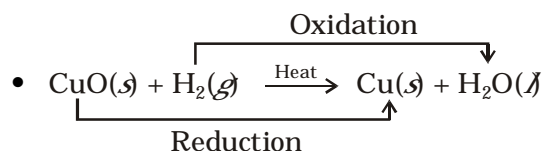
- The flow of energy in an ecosystem is unidirectional *i.e.* from 1st trophic level (producer) to last trophic level (top consumer).
- First trophic level.

27. (a) (i) Copper powder (Reactant) → Brown

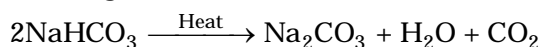
(ii) Copper oxide (Product) → Black



(c) • Yes, it can be converted back into copper.



28. Sodium hydrogen carbonate is a constituent of baking powder. On heating it gives sodium carbonate, water and carbon dioxide gas. Carbon dioxide turns lime water milky.



Na_2CO_3 is the main constituent of washing soda.

So, $\text{X} \rightarrow \text{NaHCO}_3$ $\text{Y} \rightarrow \text{CO}_2$ $\text{Z} \rightarrow \text{Na}_2\text{CO}_3$

29. (i) **Pancreatic juice** : The pancreatic juice contains enzymes like trypsin for digesting proteins and lipase for breaking down emulsified fats.

(ii) **Gastric juices** : The gastric juice is secreted by gastric glands present in the wall of the stomach. It contains hydrochloric acid, protein digesting enzyme pepsin and mucus.

- HCl creates an acidic medium, which facilitates the action of the enzyme pepsin.
- Mucus protects the inner lining of the stomach from the action of the acid under normal conditions.

Or

(a) (i) It helps to break down the large globules of fats into smaller globules thereby increasing the efficiency of the enzyme action.

(ii) Bile salts turn the acidic food coming from stomach to alkaline, which is necessary for the action of pancreatic enzymes.

(b) **Pepsin** : (i) Pepsin acts in stomach. (ii) It acts in acidic medium.

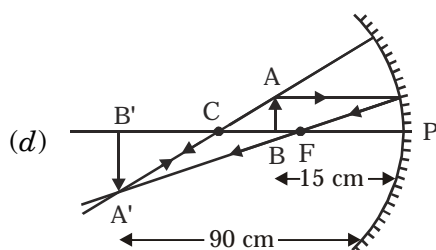
Trypsin : (i) Trypsin acts in small intestine. (ii) It acts in alkaline medium.

30. (a) Since the image to be obtained is real, so he should use concave mirror.

(b) Magnification, $m = -\frac{\text{(image-distance)}}{\text{object-distance}}$

$$\Rightarrow m = -\frac{(-90)}{-15} = -6$$

- (c) Distance between object and its image = image distance – object distance
 $= 90 - 15 = 75 \text{ cm}$



31. Convex lens : Focal length, $f_1 = 25 \text{ cm}$

Concave lens : Focal length, $f_2 = -10 \text{ cm}$.

Total focal length of both lens, $\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}$

$$\frac{1}{f} = \frac{1}{25} + \left(\frac{-1}{10}\right) = \frac{2-5}{50} = \frac{-3}{50}$$

$$f = \frac{-50}{3} \text{ cm} = \frac{-50}{300} \text{ m}$$

$$\text{Power (P)} = \frac{1}{f} = \frac{-300}{50} \text{ D} = -6 \text{ D}$$

32. (a) (i) Magnetic Field lines emerge from north pole and merge at south pole outside the magnet.

(ii) They are closed curves.

(iii) Magnetic force is greater where the field lines are crowded.

(iv) No two field lines are found to cross (intersect) each other. (Any two points)

(b) Uses of magnetic compass : (i) A magnetic compass can be used to find direction.

(ii) It can be used to test if a substance has magnetic properties or not.

Or

- Its polarity is decided by the direction of current flowing through the solenoid.
- Permanent magnets have constant magnetic field around them whereas magnetic field of electromagnet is temporary.

• Strength of an electromagnet depends on :

(i) The number of turns in the solenoid.

(ii) Strength of current flowing through the solenoid.

(iii) Position of soft iron core within the solenoid.

(Any two points)

33. • Ecosystem : All the interacting organisms in an area together with the non-living constituents of the environment.

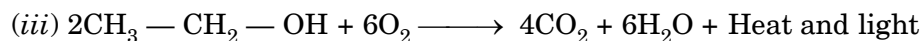
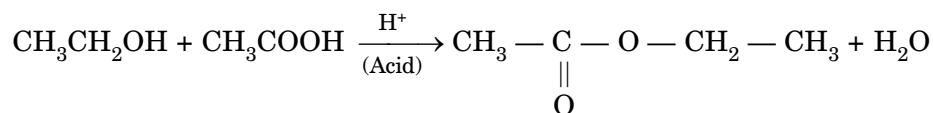
• The two components of an ecosystem are : (i) Biotic component, and (ii) Abiotic component.

• Ponds and lakes have decomposers like bacteria and other saprophytes which are natural cleaning agents. They act on biodegradable substances and break them down into simple substances. An aquarium lacks such cleaning agents. So, it has to be cleaned regularly.

34. (i) Advantage : Ethanol is a good solvent. It is used in medicines such as tincture iodine, cough syrups and many tonics.

Disadvantage : Consumption of small quantities of dilute ethanol causes drunkenness.

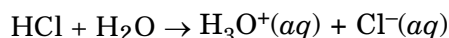
(ii) In the formation of ester, ethanol reacts with ethanoic acid in the presence of an acid catalyst, H_2SO_4 .



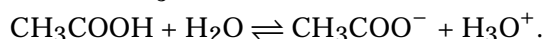
Products obtained are CO_2 gas, water and release of heat and light.

Or

(i) Mineral acids *e.g.*, HCl is a strong acid as it ionises almost completely in water.



where as carboxylic acids *i.e.*, CH_3COOH is a weak acid; its dissociation is not complete.



A 5-8% solution of acetic acid in water is called vinegar, as a result it is very weak acid.

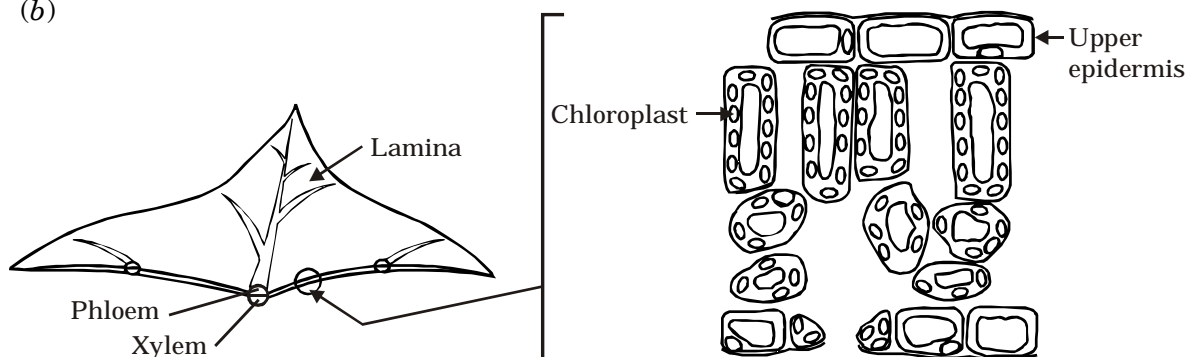
(ii) Very dilute solution of acetic acid in water *i.e.* 5-8% is called vinegar which is used as a preservative in pickles.

The melting point of pure ethanoic acid is 290 K and it often freezes during winter in cold climates so is called glacial acetic acid.

35. (a)

Autotrophic nutrition	Heterotrophic nutrition
(i) In this mode of nutrition, organisms make their own food from simple raw materials <i>e.g.</i> , CO_2 and H_2O .	(i) In this mode of nutrition, organisms are dependent on other organisms for their food requirements.
(ii) Presence of green pigment (chlorophyll) is necessary.	(ii) Presence of chlorophyll is not necessary.
(iii) Occurs in green plants and blue-green algae.	(iii) Occurs in animals and insectivorous plants.

(b)



Or

(i) Liver plays an important role in our body. It is involved in :

- Bile production and excretion
 - Excretion of bilirubin (bile pigment), cholesterol, hormones and drugs
 - Metabolism of fats, proteins and carbohydrates
 - Enzyme activation
 - Storage of glycogen, vitamins and minerals
 - Blood detoxification and purification, and
 - Synthesis of plasma proteins and clotting factors.
- (ii)
- During vigorous exercise our body needs more energy.
 - This requirement of energy is fulfilled by oxidation of food (glucose) in the cell.

- The oxidation of food requires more oxygen.
 - This requirement of more oxygen is fulfilled by faster rate of breathing.
 - It is therefore, during vigorous exercise, our breathing rate becomes faster.
- (iii) • Mucus helps in lubrication of food material to make it smooth for its easy passing in the alimentary canal.
- The mucus protects the inner walls of stomach from highly acidic environment of the stomach.

(iv) The WBCs are involved in protecting the body against both infectious diseases and foreign invaders like bacteria and viruses etc.

36. (i) $P = 25 \text{ W}$
 $V = 220 \text{ V}$
 $t = 10 \text{ hours}$
 $I = \frac{P}{V}$
 $I = \frac{25}{220} = 0.11 \text{ A}$
 $R = \frac{V}{I} = \frac{220}{0.11} = 2000 \Omega$

(ii) Energy consumed per day

$$H = I^2 R t$$

$$= (0.11)^2 \times 2000 \times 10 \times 60 \times 60$$

$$= 1.0121 \times 2000 \times 3600 = 87120 \text{ J}$$

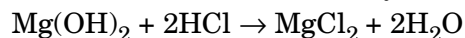
(iii) The total energy consumed by electric lamp in 30 days = $25 \times 10 \times 30$
 $= 7500 \text{ Wh} = 7.5 \text{ kWh}$

The cost @ of ₹ 5 = $5 \times 7.5 \text{ kWh} = ₹ 37.5$

37. (a) Solution A will have the highest concentration of H⁺ ions. The solution having lower pH will have more hydrogen ion concentration.

(b) Our body works within the pH range of 7 - 7.8.

(c) Antacid like Milk of magnesia is used to prevent acidity. Since, it is basic in nature (aprox. pH = 10), reacts with the excess hydrochloric acid present in the stomach and neutralises it.



Or

(d) Eating chocolates and sweets produce large amount of acid in the mouth which is not completely neutralised by the saliva produced in the mouth. When the pH of the mouth falls below 5.5, the excess acid attacks the enamel and tooth decay starts.

Toothpastes, which are generally basic in nature, neutralise the excess acid in the mouth and prevent the tooth decay.

38. (a) The process of dialysis is based on diffusion of solutes and ultra filtration of fluid across a semi-permeable membrane.

(b) The haemodialyzer (artificial-kidney) is used to remove wastes, extra salts and fluids from blood when the kidneys are no longer healthy enough to do this work properly.

(c) The tubes of dialysing unit are made of cellulose. The dialysis solution is a solution of pure water, electrolytes and salts, such as bicarbonate and sodium. Urea is the main waste which passes into dialysing solution.

Or

(d) People who have kidney failure need dialysis. The purpose of dialysate is to filter and purify the blood by pulling toxins through a process called diffusion. Unlike original kidneys, the artificial kidneys cannot reabsorb essential nutrients from the blood

39. (a) The student is suffering from short-sightedness or myopia.

(b) Iris is a dark muscular diaphragm that controls the size of the pupil. The pupil regulates and controls the amount of light.

(c) Cornea is the part of eye which is donated for eye transplant. It protects the structure inside the eye, contribute to the refractive power of the eye and focusing light rays on the retina with minimum scattering and optical degradation.

Or

(d) Hypermetropia or farsightedness is a defect of vision in which nearby objects are not seen clearly, however the distant objects are visible clearly. It is due to weakening of ciliary muscles and low converging power of eye lens. The eye ball becomes compact and the image of nearby object is formed behind the retina. It can be corrected by using spectacles with convex lenses of appropriate focal lengths.

Sample Question Paper – 9

1. (d) (i) and (iv)
2. (b) Parent acid— H_2CO_3 ; Parent base— $\text{Ca}(\text{OH})_2$
3. (a) it prevents rancidity of chips
4. (c) it substitutes hydrogen atom from the compound
5. (a) converting metal sulphides into metallic oxides and then using carbon to reduce it to obtain pure metal
6. (b) Na — positive radical; Cl — negative radical
7. (b) (ii) and (iii)
8. (c) (iii) Alveoli : Thin-walled sac like structures for exchange of gases.
9. (d) Food is transported from a region where it is produced to other parts of the plants.
10. (d) Inherited trait because it depends on the traits of preceding generation.
11. (d) his sugar level in blood was high
12. (b) bud develops due to repetitive cell division at a specific site
13. (b) Ammeter will show a current of 0.7 A.
14. (b) Insulators
15. (d) All of the above
16. (a) Soft iron
17. (a) Both A and R are true and R is the correct explanation of A
18. (a) Both A and R are true and R is the correct explanation of A
19. (b) Both A and R are true and R is not the correct explanation of A
20. (c) A is true but R is false
21. Hydrochloric acid is produced by our stomach which helps in digestion of food. When we over eat, a large amount of acid is produced which causes a burning sensation in the stomach.
Bases called antacids are used to nullify the acidity. Magnesium hydroxide (milk of magnesia) is often used for this purpose.

Or

(i) Metal 'B' will be nearer to the top of the activity series as it forms compounds in nature and not found in free state.

(ii) Copper is more reactive than silver as it displaces silver from its solution and which deposits on the copper coin.

22. The tendrils are sensitive to touch. As these tendrils come in contact with a support, the auxin diffuses towards the other side away from the support. So this part grows more rapidly than the other. This causes the tendril to circle around the support and thus climb upwards.

23. (i) Carbon dioxide.

(ii) Potassium hydroxide. It is used to absorb carbon dioxide.

(iii) The leaves of pot 'b' turn blue in iodine solution while the leaves of pot 'a' do not because in the absence of carbon dioxide, photosynthesis does not take place in this plant.

24. The two different ways by which living organisms get their food are :

(a) **Autotrophic nutrition** : In this mode of nutrition, organisms make their own food from inorganic raw materials. For example : Green plants.

(b) **Heterotrophic nutrition** : In this mode of nutrition, organisms are dependent on other organisms for their food requirements. For example : Animals, fungi and bacteria.

25. (a) Mirror B and C of focal length 15 cm, 10 cm. This is because an image equal in size to that of object is formed if object placed at C.

(b) For shaving purpose object is placed between f and P so that magnified virtual image can be produced. Thus the mirror which would be preferred to be used for shaving purpose is B.

Or

Concave mirror	Convex mirror
(i) A spherical mirror, whose reflecting surface is curved inwards is called a concave mirror.	(i) A spherical mirror, whose reflecting surface is curved outwards is called convex mirror.
(ii) It forms real and inverted, virtual and erect images.	(ii) It always forms virtual and erect images.
(iii) Image size is some-times smaller and some-times larger.	(iii) Image is always smaller.

(Any two points)

26. Natural ecosystems : Forest ecosystem, marine ecosystem.

Artificial ecosystem : Aquarium and cropland ecosystem.

27. Observations : (a) Reaction takes place vigorously.

(b) A large amount of heat is produced.

Uses of the product obtained $[\text{Ca}(\text{OH})_2]$: (a) It is used for white washing. It slowly reacts with the CO_2 in air to form a thin layer of calcium carbonate on the walls.

(b) It is used as a laboratory reagent.

28. Plaster of Paris is calcium sulphate hemihydrate $\left(\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}\right)$ or two formula units of CaSO_4 sharing one molecule of water whereas gypsum has two water molecules with one formula unit of CaSO_4 i.e., $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

These both are interconvertible :
$$\underset{\text{(Gypsum)}}{\text{CaSO}_4 \cdot 2\text{H}_2\text{O}} \xrightleftharpoons{373\text{ K}} \underset{\text{(Plaster of Paris)}}{\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}} + 1\frac{1}{2}\text{H}_2\text{O}$$

Uses of Plaster of Paris :

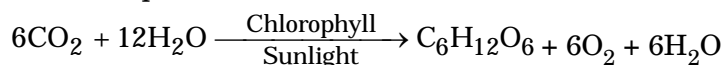
(a) Used as plaster for supporting fractured bones in the right position.

(b) Used for making toys and materials for decoration.

29. (a) Photosynthesis is considered to be an ultimate source of food for almost all plants and animals. It is the process by which green plants synthesize food.

(b) It consumes carbon dioxide and releases oxygen which is a source of respiration to all living organisms.

(c) This process keeps the concentration of two gases i.e., oxygen and carbon dioxide almost constant in the atmosphere.



Or

- The largest gland in human body is liver.
- It secretes bile juice, which is stored in gall bladder.

Functions : (i) It produces bile which helps in the emulsification of fats.

(ii) It stores glucose as glycogen.

(iii) It breaks down glycogen into glucose.

(iv) It helps in decomposition of RBC and plasma proteins.

(v) It detoxifies chemicals and metabolizes drugs. (Any three points)

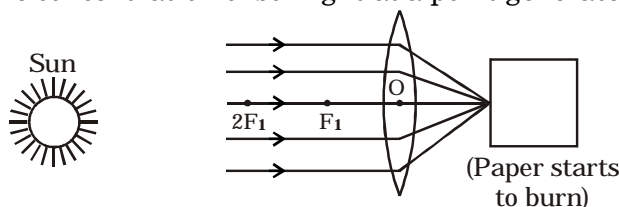
30. Focal length of mirror, $f = -20$ cm

Object-distance, $u = -25$ cm

As the object is in between focus and centre of curvature in the front of a concave mirror, image formed will be **real** and **inverted** and **beyond C**. The dimension of the image will be larger than that of object.

When object is moved to 15 cm *i.e.*, object becomes within focal length then image will become virtual and erect and formed behind the mirror.

31.(a) As the convex lens converges the rays, so, all the parallel rays of sun converge at the paper on a fixed point called focus plane. The paper begins to burn producing smoke. It may even catch fire after a while. The concentration of sunlight at a point generated heat.

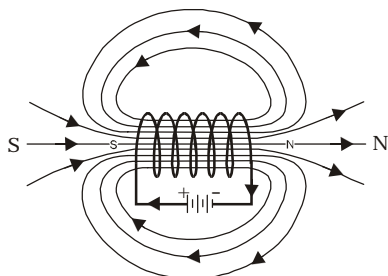


(b) Concave lens diverges the light rays. Rays are not concentrated in a particular region or a point, so paper won't be burnt.

32. (a) Solenoid

(b) The magnetic field is uniform.

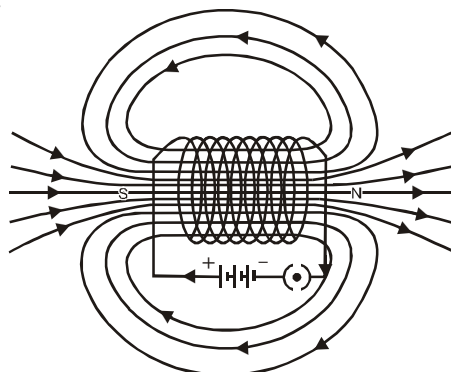
(c)



(d) If an iron core is placed within the coil AB, it will become an electromagnet.

Or

(a) A coil of many circular turns of insulated copper wire wrapped closely in the shape of the cylinder is known as a solenoid.



(b) The field lines inside the solenoid are in the form of parallel straight lines.

It indicates that the magnetic field is uniform.

(c) A solenoid is used to magnetise a soft iron piece to obtain electromagnet.

33. (a) • Judicious use of natural resources.
 • Awareness about conservation of natural resources.
 • To conserve the energy.
 • Inculcate the habit of safe disposal of wastes.
 • To become environment friendly.

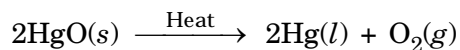
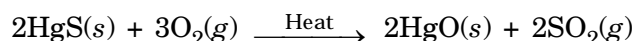
(b) Sense of responsibility, concern for the environment.

34. (a) **Experiment** : • Take an aluminium or copper wire. Clamp this wire on a stand.
 • Fix a pin to the free end of the wire using wax.
 • Heat the wire with a spirit lamp, candle or a burner near the place where it is clamped.

Observation : After sometime we observe that the wax gets melt. This is because of heat transfer through the metal when it is heated.

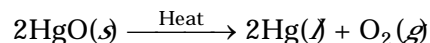
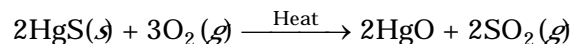
Result : The above observation shows that metals are good conductors of heat.

(b) **Extraction of mercury from cinnabar (HgS)** : First cinnabar (HgS) is heated and converted into mercuric oxide (HgO). Mercuric oxide is then reduced to mercury on further heating.

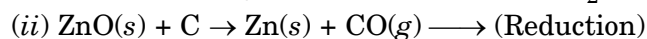
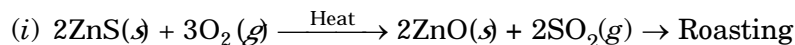


Or

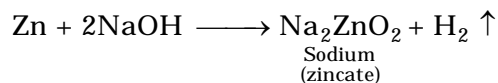
(a) Mercury (Hg) or Cinnabar ore lies low in the activity series *i.e.*, it is very unreactive. Oxide of mercury can be reduced to metal by heating alone.



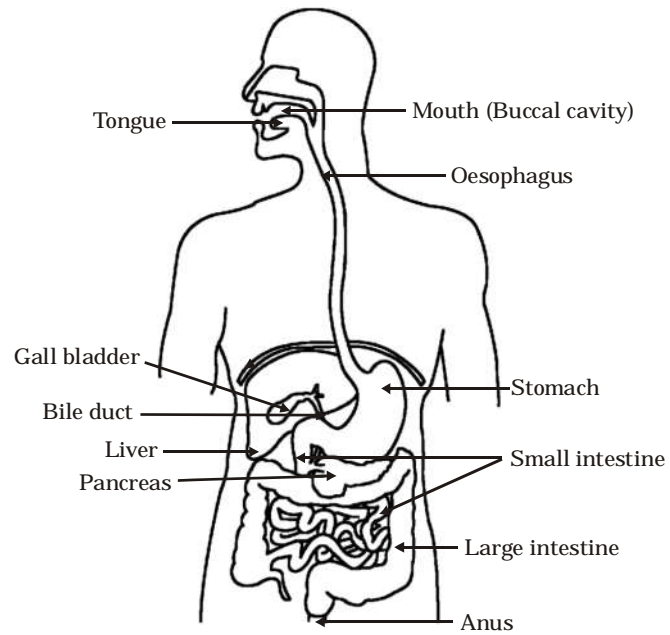
Zinc (Zn) lies middle in the activity series and is moderately reactive. It is found in the form of ZnS. It is first roasted and then reduced to corresponding metal, using a reducing agent such as carbon. Extraction of zinc from zinc blende is shown in two steps :



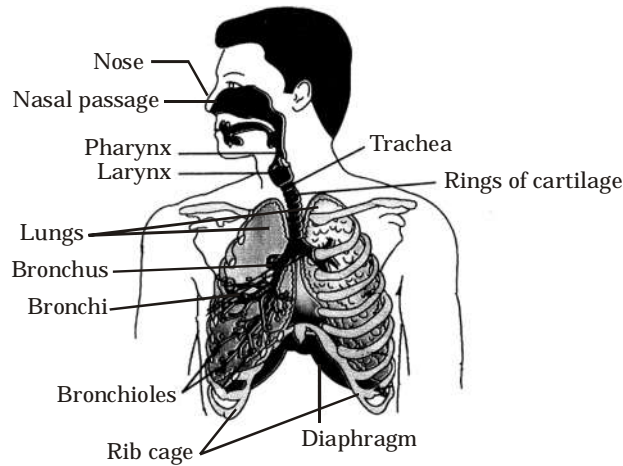
(b) We cannot store concentrated solution of sodium hydroxide in zinc container because when zinc is heated with concentrated sodium hydroxide solution, sodium zincate is formed with evolution of hydrogen gas.



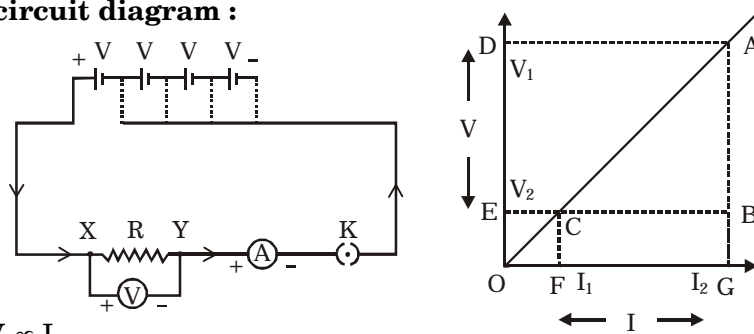
35. Human digestive system :



Or



36. Labelled circuit diagram :



$$V \propto I$$

$$\frac{V}{I} = \text{Constant} = R$$

$$V = IR$$

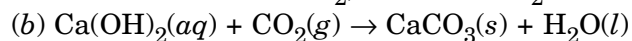
Here, current (I) = 0.15 A, potential difference (V) = 1.05 V.

then,
$$\frac{V}{I} = R$$

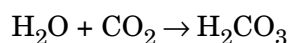
$$\begin{aligned} \therefore R &= \frac{V}{I} \\ &= \frac{1.05 \text{ V}}{0.15 \text{ A}} = 7 \text{ ohm} \end{aligned}$$

$$R = 7 \Omega$$

37. (a) Lime water : Ca(OH)_2 , Gas 'A' is CO_2

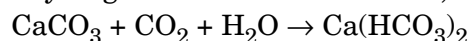


(c) When gas 'A' (CO_2) is passed through ordinary water, carbonic acid (H_2CO_3) is formed. It is a weak acid. The chemical reaction in which carbonic acid is formed is as follows:



Or

(d) When more of gas CO_2 was passed through the cloudy/turgid solution, the calcium carbonate that was formed initially dissolves because of the formation of soluble salt compound *i.e.*, calcium hydrogen carbonate. As a result, the solution turns clear.



38. (a) The process of breakdown of food in the cell with the release of energy is called cellular respiration. Cellular respiration takes place in the cells of all organisms.

(b) Alcoholic fermentation, the products formed in the process are ethanol, carbon dioxide and energy in the form of ATP.

(c) Anaerobic respiration. In humans, the formation of lactic acid takes place during anaerobic respiration which occurs in muscles during strenuous exercise when sufficient oxygen is not available. It results to muscle fatigue.

Or

(d) **Aerobic respiration:** Site: cytoplasm as well as mitochondria, Energy: 38 (36) ATP molecules, End products: carbon dioxide and water

Anaerobic respiration: Site: cytoplasm only, Energy: 2 ATP molecules only, End products: Lactic acid or ethanol and carbon dioxide.

39. (a) Galvanometer is used, because it is used to detect the current.

(b) Needle deflects monetarily because a current is induced when the magnet is moved towards the coil.

(c) There will be no deflection in the Galvanometer as they are moving with same speed, so there will be no change in the magnetic field and the current is not induced.

Or

(d) Electromagnetic induction: It is a process in which the current is induced in a coil when a magnet is passed through it.

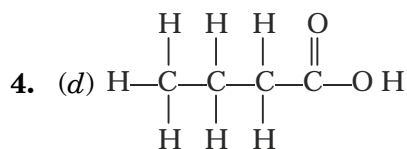
Increase in number of turns will increase the current induced and a stronger magnet will increase the current many fold times.

Sample Question Paper – 10

1. (c) HCl and NH_4OH

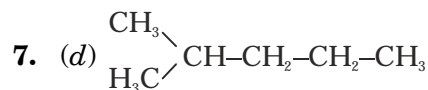
2. (c) Endothermic — 3; Exothermic — 3

3. (a) the oils in the bread oxidises and causes rancidity



5. (d) the swings with black paper to protect them from sunlight

6. (b) (ii) and (iii)



8. (d) (i), (ii) and (iii)

9. (b) They selectively filter toxic substances through their leaves.

10. (b) (i) and (iv)

11. (b) testosterone

12. (d) to develop new independent individual

13. (b) They are inversely related to each other.

14. (d) Parallel combination, which results in a net resistance of 0.5Ω .

15. (d) Alloy bar because it has different types of atoms.

16. (c) The number of lines crossing a given point

17. (c) A is true but R is false

18. (d) A is False but R is true

19. (c) A is true but R is false

20. (c) A is true but R is false

21. A substance which forms H^+ ions in aqueous solution is called an acid and the one which forms OH^- ions in aqueous solution is called a base.

Weak acid : CH_3COOH (Acetic acid)

Strong base : NaOH (Sodium hydroxide)

Or

No. Anode is made up of impure metal. On passing the current through the electrolyte, the pure metal from the anode dissolves into the electrolyte.

22. • The age between 10-12 years is called puberty.

• At this age hormones are secreted by reproductive glands — testis in males secretes testosterone and ovary in females secretes oestrogen.

• These hormones are responsible to bring out the dramatic changes in our body.

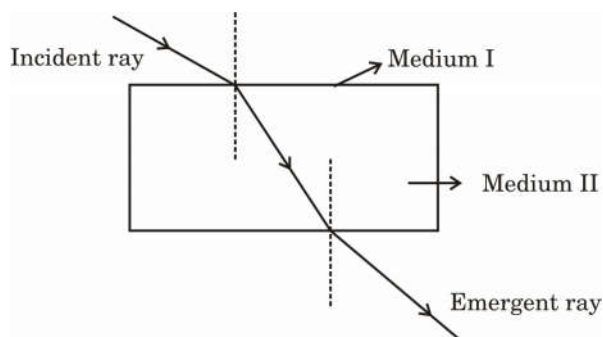
23. (i) Haemoglobin.

(ii) The blood brings carbon dioxide from the rest of the body for release into the lungs.

24. (a) The build-up of lactic acid in our muscles during sudden activity causes cramps.

(b) Anaerobic respiration.

25. (a)



(b) As the refractive index of medium II is high so it is more optically denser medium.

Or

(a) Convex lens

(b) Focal length of the lens is 2 m.

Distance of candle flame from the lens is 4 m.

26. If deers are removed from the given food chain then :

• Tigers will not survive.

• Plants will increase in number.

27. (i) • At anode, oxygen gas is evolved. • At cathode, hydrogen gas is evolved.

(ii) The volume of gas collected in the two test tubes are not the same because in water, hydrogen and oxygen are present in the ratio of 2 : 1 by mass.

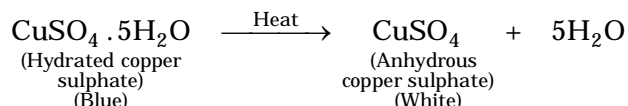
(iii) This reaction is decomposition reaction.

The gases collected can be distinguished by burning a candle close to two electrodes one by one. Hydrogen gas burns with a popping sound whereas with oxygen gas, candle burns with a blue flame.

(iv) We use salt water to conduct electricity through it.

28. (a) Some salts crystallise with fixed number of water molecules present in one formula unit of a salt. These are called hydrated salt, although these are dry.

On heating such crystals, the water molecules are removed and these are called anhydrous salt, *i.e.*,



(b) Washing soda is decahydrate sodium carbonate, ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$). On heating washing soda, anhydrous sodium carbonate, (Na_2CO_3) is obtained. This is called soda ash.

(c) Baking soda is sodium hydrogen carbonate (NaHCO_3), whereas baking powder is a mixture of baking soda (sodium hydrogen carbonate) and a mild edible acid such as tartaric acid ($\text{C}_4\text{H}_6\text{O}_6$).

29. (a) Herbivores eating grass need a longer small intestine to allow the cellulose to be digested whereas carnivores have a shorter small intestine because meat is easy to digest.

(b) Cartilage rings prevent the trachea from collapsing when there is no air inside it.

(c) (i) Mucus protects the inner lining of stomach from the action of HCl, under normal conditions.

(ii) Mucus makes the food smoother to pass down easily into the small intestine and allows its complete digestion.

Or

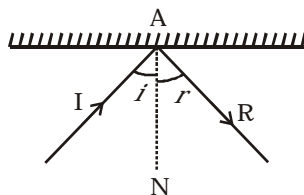
Breathing	Respiration
1. It is mechanical process.	1. It involves both physical/mechanical and chemical processes.
2. It involves only intake of O_2 and release of CO_2 .	2. It involves the use of O_2 to oxidise food in the cells.
3. In this process, energy is utilized.	3. In this process energy is liberated in the form of ATP.
4. It is restricted to higher animals (mostly mammals) only.	4. It is found in all living organisms.

(Any three points)

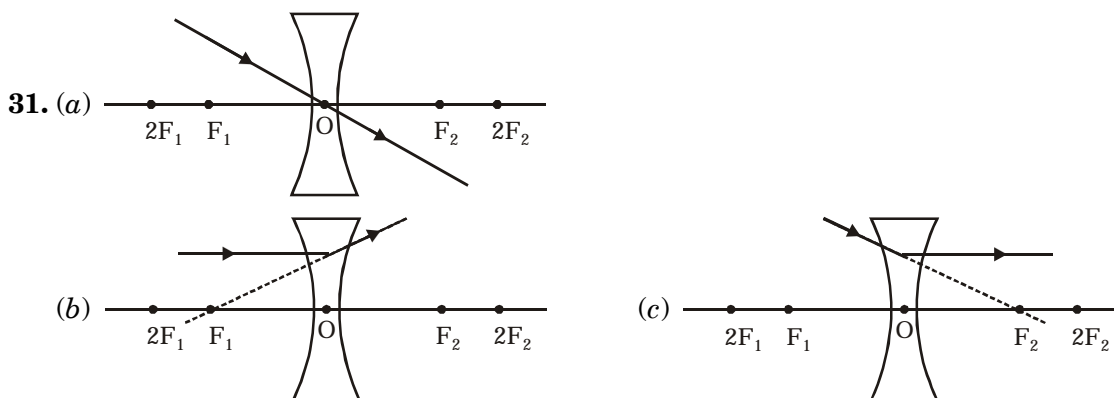
30. Laws of reflection of light are as follows :

(i) The angle of incidence is equal to the angle of reflection ($\angle i = \angle r$).

(ii) The incident ray (I), the normal (AN) to the mirror at the point of incidence (A) and the reflected ray (R), all lie in the same plane.



If the angle of incidence is 32.5° , then angle of reflection will also be 32.5° due to laws of reflection of light.



32. (i) No force will experience as the particle is at rest because magnetic field deals with moving charges.

$$\text{or } F = qvB \sin \theta, \text{ being } v = 0, F = 0.$$

(ii) As alpha particle moves in the same direction of magnetic field so it will experience no force.

(iii) As an alpha particle enters perpendicular to field lines, it will experience maximum force according to Fleming's left hand rule.

Or

Characteristics : • It should have low melting point. • It should have high resistance.

It should be made of aluminium or copper (alloys or Sn, Pb or Zn).

Fuse is always connected in series.

For protecting appliances due to short circuits or overloading, the fuse is related for certain maximum current and blows off when a current is more than the rated value flows through it.

33. (i) It should be ensured that biodegradable and non-biodegradable wastes are collected separately.

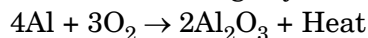
(ii) A biogas plant can be set up in the school where the biodegradable wastes etc., are dumped and used to harness energy. The fuel can be used in school canteen while the manures thus obtained can be used in the school garden.

(iii) Paper bags and cups should be used instead of plastic bags and cups.

(iv) Students and the school staffs should be advised to use public transport, which not only save fuel but also help in controlling pollution.

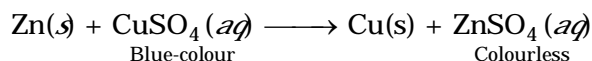
34. (a) Ca and Mg contain two valence electrons in their outermost shell. They react with moisture, oxygen, carbon dioxide or other chemical reagents to form compounds in combined form to attain noble gas configuration. On the other hand, gold and platinum are unreactive metal and so, they are found in free state.

(b) Moist air reacts with aluminium to form a strong but thin (0.00001 mm) film of aluminium oxide on its surface which makes its metallic lustre slightly dull. This process is called anodizing.



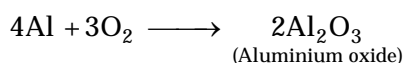
(c) Aluminium oxide is ionic in nature. It forms a very strong bond. Aluminium is stronger than coke and has stronger affinity on oxygen than on coke.

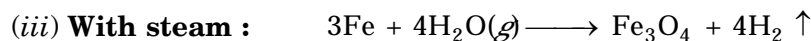
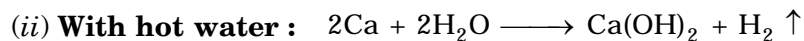
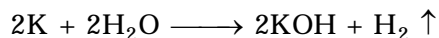
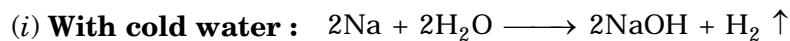
(d) Zinc is more reactive than Cu. Therefore, zinc displaces copper from copper sulphate solution.



Or

Metals occur in nature in form of carbonates, oxides, halides, sulphates and sulphides.



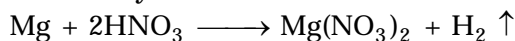
Reaction of metal with water :

Some metals like Cu, Ag, Pt, Hg, Au do not react with any form of water.

Reaction with acid : (a) Most reactive metals like Ca, Mg, Al, Zn, Fe etc. react with acids like HCl, H_2SO_4 , CH_3COOH forming salt and water.



(b) HNO_3 does not give H_2 gas with mostly metals because HNO_3 is a strong oxidising agent. It converts the produced H_2 to H_2O and itself reduced to any one oxide NO, NO_2 or N_2O . Exceptionally Mn and Mg react with very dilute nitric acid.



35. Two different types of movements in plants are :

- (1) Directional or tropic movements; (2) Non-directional or nastic movements.

Tropic Movements	Nastic Movements
(i) These movements are directional.	(i) These movements are non-directional.
(ii) The movements can be towards the stimulus or away from the stimulus. Examples : Phototropism, geotropism etc.	(ii) They are neither towards stimulus nor away from the stimulus. Examples : Folding the leaves of sensitive plant in response to touch.
(iii) Tropic movements mostly occur in cylindrical organs. <i>e.g.</i> , shoot tips.	(iii) Mostly occur in flat or asymmetrical organs. <i>e.g.</i> , leaves.

Or

(a) **Hormones :** Hormones are the chemical messengers that regulate the biological processes in living organisms.

Characteristics of hormones : • They are produced by ductless glands *i.e.* their secretion is directly released into the blood.

- They are released in traces *i.e.* in a very little quantity.
 - They act on specific tissues or organs called target organs.
 - They are organic compounds.
 - They are generally slow in action.
 - They act away from the site of production. (Any four)
- (b) (i) Dwarfness (Low height) (ii) Gigantism (Excessive growth)
(iii) Diabetes mellitus (iv) Goitre

36. (a) Ohm's law establishes a relation between potential difference (V) and current (I).

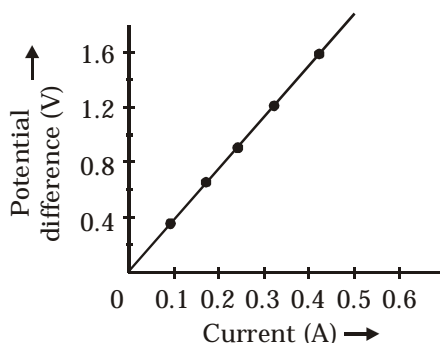
It states that, at same physical conditions, (*i.e.*, constant temperature and pressure), the current flowing through a conductor is directly proportional to the potential difference across it.

(b) Mathematically, $V \propto I$

or $\frac{V}{I} = \text{Constant} = R$ [Here, V = Voltage, I = Current, R = Resistance]

or $V = IR$

(c)

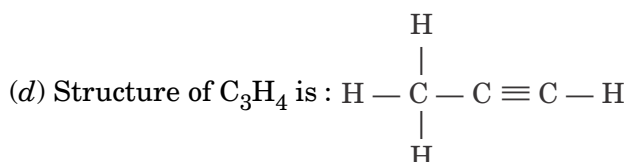


V-I graph for verification of Ohm's law

37. (a) The fourth member of alkenes series of hydrocarbons is pentene, C_5H_{10}

(b) Hydrogenation reaction. Catalyst - Nickel

(c) Hydrocarbon is Propyne = C_3H_4 .

**Or**

(d) The test which can be used to differentiate between saturated and unsaturated hydrocarbons is bromine water test.

When bromine water is treated with unsaturated hydrocarbons, the bromine gets attached to hydrocarbon and thus the red-brown colour of bromine gets decolourised.

On the other hand, when bromine water is reacted to saturated compounds, the red-brown colour of bromine remains the same.

38. (a) 120-80 mm/Hg.

(b) Sphygmomanometer

(c) When the upper limit of blood pressure gets above 120 mm/Hg it is considered to be on high side.

High blood pressure may lead to headaches, chest pain, irregular heart beat and even heart attack.

Or

(d) When anyone has high blood pressure, the heart has to work harder to pump blood. The strain causes the walls of the heart's pumping chamber to thicken. Eventually, the heart can't pump enough blood to meet the body's needs, causing heart failure.

39. (a) Electric fuse is a safety device which protects electric circuits and appliances by stopping the flow of unduly high electric current. It is used in series with the device.

(b) Fuse is made of an alloy of appropriate melting point (like aluminium, copper, iron and lead etc.). If a current larger than the specified value flows through the circuit, the temperature of the fuse wire increases; it melts the fuse wire and breaks the circuit.

(c) We use parallel combination of connecting electrical appliances in household circuit because:

(i) Each device can be operated independently and we don't need to switch on the other device.

(ii) If any device is not working, it will not affect the other device.

(iii) All devices will get same rated voltage.

Or

(d) We do not use series combination of connecting electric appliances in household circuits because:

(i) In series combination, all appliances do not get an equal supply of voltage from the main supply.

(ii) If one appliance is not working properly other appliances won't get affected.