



*Reliable*  
**SAMPLE  
QUESTION PAPER**  
(with Marking Scheme)  
**SCIENCE**

As per Latest CBSE Sample Paper for 2021-22 with Marking Scheme released on 14.01.2022 (CBSE Circular No. Acad-07/2022)

**2 Papers**

**10**

Units/No. of Questions	2 Marks	3 Marks	4 Marks (Case-Study)	Total Marks
I. Chemical Substances— Nature and Behaviour (Chapter-4 & 5)	02	02 + 01 OR		10
II. World of Living (Chapter-8 & 9)	03 + 01 OR	01	01	13
IV. Effects of Current (Chapter-12 & 13)	01 + 01 OR	02 + 01 OR	01	12
V. Natural Resources (Chapter-15)	01 + 01 OR	01		05
Total	07	06	02	40



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Total	07	06	02	40

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1. CBSE Sample Question Paper (*Solved*)

2. *Reliable* Sample Question Paper – 02

**Answer** *Reliable* Sample Question Paper – 02

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or  
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# CBSE SAMPLE QUESTION PAPER (with Marking Scheme)

# 1

SCIENCE (TERM-II)

Maximum Marks : 40

CLASS-X

Time allowed : 2 Hours

## General Instructions :

- All questions are compulsory.
- The question paper has three sections and 15 questions. All questions are compulsory.
- Section–A has 7 questions of 2 marks each; Section–B has 6 questions of 3 marks each; and Section–C has 2 case based questions of 4 marks each.
- Internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

### SECTION-A

1. The table shows the electronic structures of four elements.

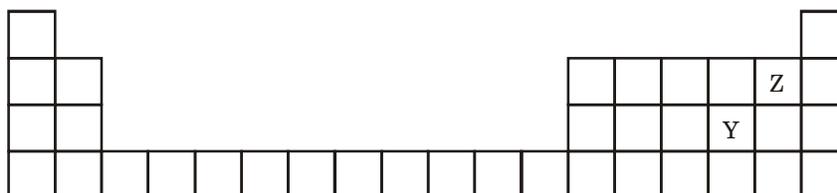
Element	Electronic Structure
P	2, 6
Q	2, 8, 1
R	2, 8, 7
S	2, 8, 8

- Identify which element(s) will form covalent bonds with carbon.
- “Carbon reacts with an element in the above table to form several compounds.” Give suitable reason. **2**

Ans. (a) P and R ( $\frac{1}{2} + \frac{1}{2}$  Mark)  
(b) Carbon has a valency four or Tetravalency and Catenation ( $\frac{1}{2} + \frac{1}{2}$  Mark)

2. The diagram below shows part of the periodic table.

- Which elements would react together to form covalent compounds?
- Between the two elements W and Z, which will have a bigger atomic radius? Why? **2**



Ans. (a) Y and Z ( $\frac{1}{2} + \frac{1}{2}$  Mark)  
(b) W is bigger ( $\frac{1}{2}$  Mark)  
Reason : Down the group number of shells increases. ( $\frac{1}{2}$  Mark)

- Trace the path a male gamete takes to fertilise a female gamete after being released from the penis.
  - State the number of sets of chromosomes present in a zygote. **2**

Ans. (a) Male gamete (sperm) travels in the female reproductive tract after being released. The path which it takes to fertilise the female gamete (egg) is vagina ( $\frac{1}{2}$  Mark)  
uterus ( $\frac{1}{2}$  Mark)  
fallopian tube ( $\frac{1}{2}$  Mark)  
resulting in a zygote;

Alternatively accept the labelled figure of human female reproductive system indicating the passage of sperm from vagina (½ Mark)  
 to uterus (½ Mark)  
 and then to fallopian tube (½ Mark)  
 for fertilisation resulting in a zygote;  
 (b) Zygote has 2 sets of chromosomes/ (½ Mark)  
 alternatively accept  $2n$ . No marks to be assigned for  $n$  or  $3n$ .

4. **Rajesh observed a patch of greenish black powdery mass on a stale piece of bread.**  
 (a) **Name the organism responsible for this and its specific mode of asexual reproduction.**  
 (b) **Name its vegetative and reproductive parts.** 2

**Ans.** (a) The greenish black powdery mass on a stale piece of bread is due to bread mould *Rhizopus* (½ Mark)  
 which reproduces by spore formation. (½ Mark)  
 (b) Hyphae or thread like structures are the vegetative part (½ Mark) and tiny blob like structures or sporangia are the reproductive parts. (½ Mark)

5. **Mustard was growing in two fields — A and B. While Field A produced brown coloured seeds, field B produced yellow coloured seeds.**  
**It was observed that in field A, the offsprings showed only the parental trait for consecutive generations, whereas in field B, majority of the offsprings showed a variation in the progeny.**  
**What are the probable reasons for these?** 2

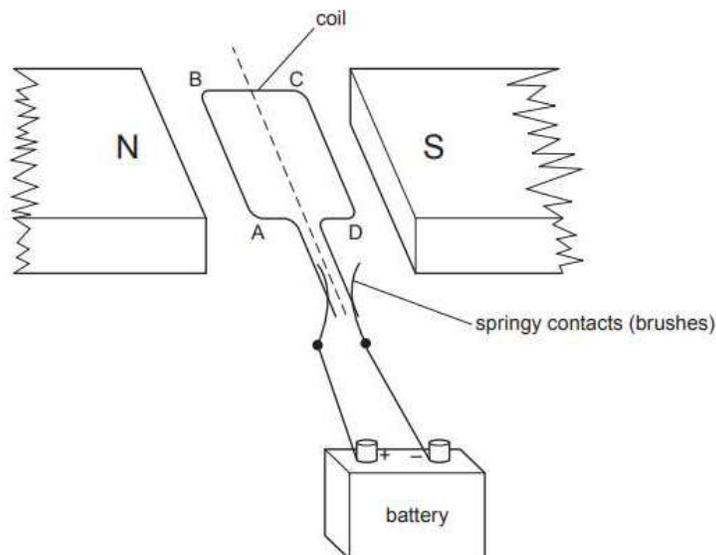
**Ans.** (a) In field A, the reason for parental trait in consecutive generations of the offsprings is self-pollination. (1 Mark)  
 (b) In field B, variation is seen to occur because of recombination of genes as cross-pollination is taking place. (1 Mark)

**Or**

**In an asexually reproducing species, if a trait X exists in 5% of a population and trait Y exists in 70% of the same population, which of the two trait is likely to have arisen earlier? Give reason.**

**Ans.** Trait Y which exists in 70% (larger fraction) of the population, is likely to have arisen earlier because in asexual reproduction, identical copies of DNA are produced and variations do not occur. (1 Mark)  
 New traits come in the population due to sudden mutation and then are inherited. 70% of the population with trait Y is likely to have been replicating that trait for a longer period than 5% of population with trait X. (1 Mark)

6. **A simple motor is made in a school laboratory. A coil of wire is mounted on an axle between the poles of a horseshoe magnet, as illustrated.**



In the example above, coil ABCD is horizontal and the battery is connected as shown.

(a) For this position, state the direction of the force on the arm AB.

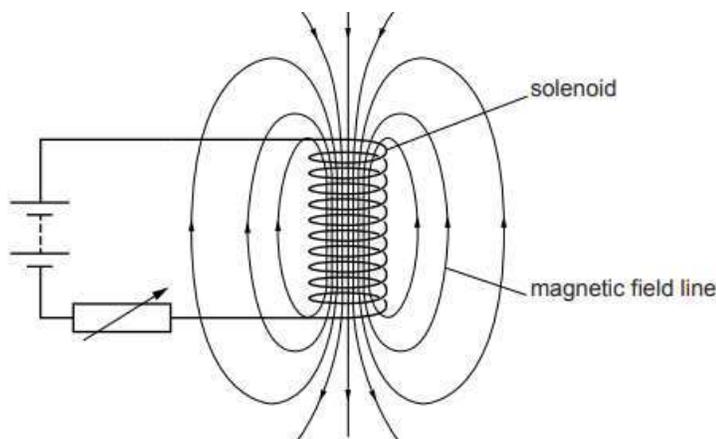
(b) Why does the current in the arm BC not contribute to the turning force on the coil? 2

Ans. (a) Downwards (1 Mark)

(b) Because BC is in the same direction as the direction of field lines. Force is minimum when the direction of current in the conductor is the same as that of the magnetic field. BC will not contribute as the force on this part of the coil will be cancelled by the force on DA. (1 Mark)

Or

A circuit contains a battery, a variable resistor and a solenoid. The figure below shows the magnetic field pattern produced by the current in the solenoid.



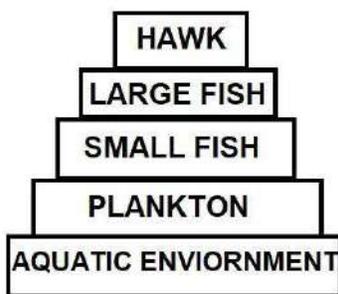
(a) State how the magnetic field pattern indicates regions where the magnetic field is stronger.

(b) What happens to the magnetic field when the current in the circuit is reversed?

Ans. (a) Relative closeness of field lines indicates the strength of magnetic field. Since field lines are crowded around the ends of the solenoid, hence these are the regions of strongest magnetism. (1 Mark)

(b) The direction of the field will also be reversed. (1 Mark)

7. DDT was sprayed in a lake to regulate breeding of mosquitoes. How would it affect the trophic levels in the following food chain associated with a lake? Justify your answer. 2



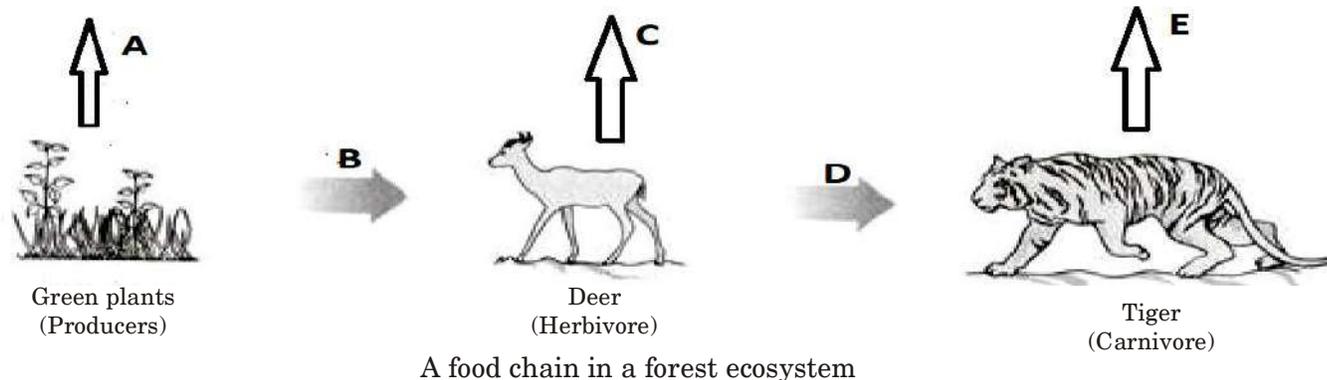
Ans. ● DDT being a non- biodegradable pesticide will enter the food chain from the first trophic level *i.e.*, Plankton. (½ Mark)

● Non-biodegradable pesticides accumulate progressively at each trophic level. This phenomenon is known as biological magnification. (1 Mark)

● HAWK will have the highest level of pesticide. (½ Mark)

Or

In the following food chain, vertical arrows indicate the energy lost to the environment and horizontal arrows indicate energy transferred to the next trophic level. Which one of the three vertical arrows (A, C and E) and which one of the two horizontal arrows (B and D) will represent more energy transfer? Give reason for your answer.



**Ans.** A will represent more energy transfer as compared to C and E. (½ Mark)

B will represent more energy transfer as compared to D. (½ Mark)

When green plants are eaten by primary consumers, a great deal of energy is lost as heat to the environment, some amount goes into digestion and in doing work and the rest goes towards growth and reproduction. An average of 10% of the food eaten is made available for the next level of consumers. This loss of energy takes place at every trophic level. (1 Mark)

Alternatively accept : In accordance with 10% law of transfer of energy in a food chain only 10% of energy available at one trophic level is transferred to the next trophic level.

**SECTION-B**

**8. Choose an element from period 3 of modern periodic table that matches the description given below in each instance. Give reason for your choice.**

- (a) It has a similar structure to diamond.
- (b) It has same valency as Lithium.
- (c) It has variable valency and is a member of the Oxygen family (group 16). 3

**Ans.** (a) Silicon  
Reason : Tetrahedral structure

*Or*

Tetravalency or Four valency and catenation

*Or*

Covalent bonding like carbon (½ + ½ Mark)

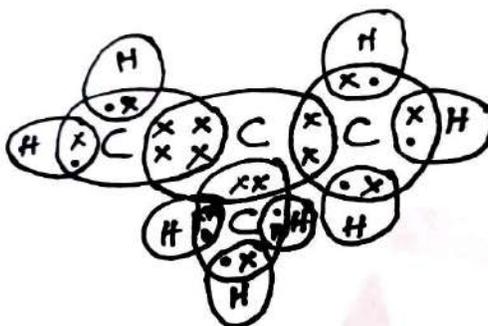
(b) Sodium  
Reason : It has 1 valence electron like Lithium (½ + ½ Mark)

(c) Sulphur  
Reason : It forms oxides SO<sub>2</sub> and SO<sub>3</sub> (½ + ½ Mark)

**9. (a) How many isomers are possible for the compound with the molecular formula C<sub>4</sub>H<sub>8</sub>? Draw the electron dot structure of branched chain isomer.**

(b) How will you prove that C<sub>4</sub>H<sub>8</sub> and C<sub>5</sub>H<sub>10</sub> are homologues? 3

**Ans.** (a) Four (½ + 1 marks)



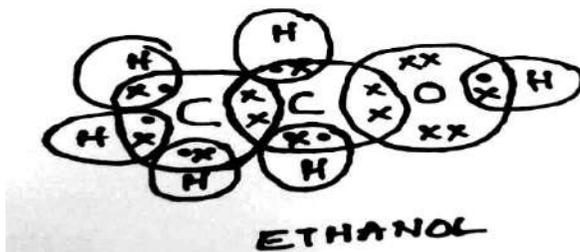
- (b)  $C_4H_8$  and  $C_5H_{10}$  are homologues (½ Mark)  
as they differ in
- —  $CH_2$
  - differ in 14u molecular mass
  - Same functional group
  - Same general formula (Any two reasons) (½ + ½ Mark)

Or

A carbon compound 'A' having melting point 156 K and boiling point 351 K, with molecular formula  $C_2H_6O$  is soluble in water in all proportions.

- (a) Identify 'A' and draw its electron dot structure.  
(b) Give the molecular formulae of any two homologues of 'A'.

Ans. (a) Ethanol;  $C_2H_5OH$  (1 + 1 Marks)



- (b)  $CH_3OH$  and  $C_3H_7OH$  are homologues of ethanol. (1 Mark)

Or

$CH_4O$  and  $C_3H_8O$

10. Two pea plants — one with round yellow seeds (RRYY) and another with wrinkled green (rryy) seeds produce F<sub>1</sub> progeny that have round, yellow (RrYy) seeds.

When F<sub>1</sub> plants are self-pollinated, which new combination of characters is expected in F<sub>2</sub> progeny? How many seeds with these new combinations of characters will be produced when a total 160 seeds are produced in F<sub>2</sub> generation? Explain with reason. 3

Ans. Round green (½ Mark) : 30 (½ Mark)

Wrinkled yellow (½ Mark) : 30 (½ Mark)

New combinations are produced because of the independent inheritance of seed shape and seed colour trait. (1 Mark)

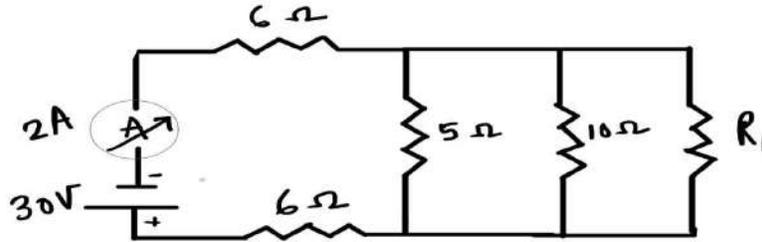
11. (a) It would cost a man ₹ 3.50 to buy 1.0 kWh of electrical energy from the Main Electricity Board. His generator has a maximum power of 2.0 kW. The generator produces energy at this maximum power for 3 hours. Calculate how much it would cost to buy the same amount of energy from the Main Electricity Board. (1 Mark)

- (b) A student boils water in an electric kettle for 20 minutes. Using the same mains supply he wants to reduce the boiling time of water. To do so should he increase or decrease the length of the heating element? Justify your answer. (2 Marks) 3

Ans. (a)  $E = P \times T$   
So,  $E = 3 \times 2$   
 $= 6 \text{ kWh}$  (1 Mark)  
Cost of buying electricity from the main electricity board  
 $= 6 \times 3.50$   
 $= ₹ 21.0$

- (b) To reduce the boiling time using the same mains supply, the rate of heat production should be large. We know that  $P = V^2/R$ . Since  $V$  is constant,  $R$  should be decreased. Since  $R$  is directly proportional to  $l$  so length should be decreased. (2 Marks)

12.



In the above circuit, if the current reading in the ammeter A is 2 A, what would be the value of  $R_1$ ? 3

**Ans.** 5 ohm, 10 ohm and  $R_1$  are in series

$$1/R_p = \frac{1}{5} + \frac{1}{10} + \frac{1}{R_1}$$

$$1/R_p = \frac{(2+1)}{10} + \frac{1}{R_1}$$

$$= \frac{3}{10} + \frac{1}{R_1}$$

$$1/R_p = \frac{(3 R_1 + 10)}{10 R_1}$$

$$R_p = \frac{10 R_1}{(3 R_1 + 10)}$$

Now, 6 ohm, 6 ohm and  $R_p$  are in series

Thus,

$$R_{eq} = \frac{12 + 10 R_1}{(3 R_1 + 10)} \quad \dots(1) \quad (1 \text{ Mark})$$

$$V = I R_{eq}$$

From the circuit

$$R_{eq} = \frac{30}{2} = 15 \text{ A} \quad \dots(2) \quad (1 \text{ Mark})$$

Equating (1) and (2),

$$\frac{12 + 10 R_1}{(3 R_1 + 10)} = 15$$

$$\frac{10 R_1}{(3 R_1 + 10)} = 3$$

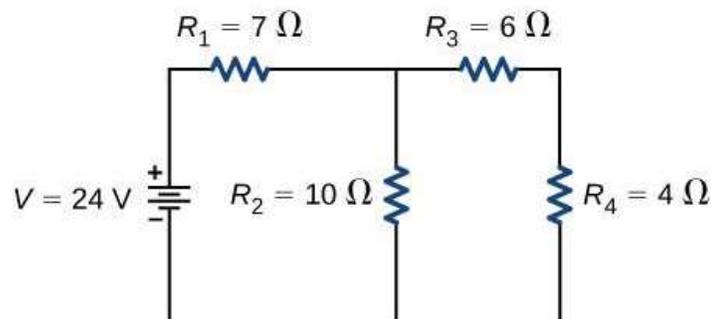
$$10 R_1 = (9 R_1 + 30)$$

Thus,

$$R_1 = 30 \text{ ohm}$$

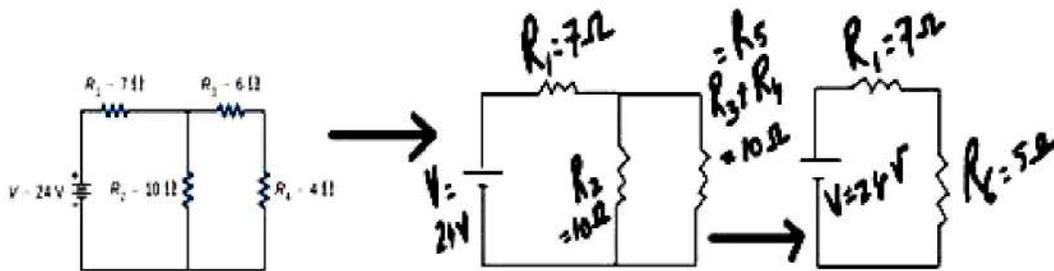
(1 Mark)

**Or**



Calculate the total resistance of the circuit and find the total current in the circuit.

Ans.



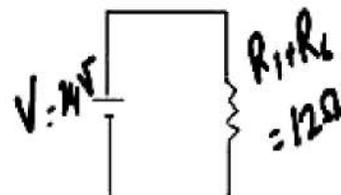
R3 and R4 are in series, hence the equivalent resistance of those two =  
 $R_5 = R_3 + R_4 = 10 \text{ ohms}$ . **0.5 marks**

R5 and R2 are in parallel. Let R6 be the equivalent resistance for them.  
 Hence  $R_6 = \frac{R_5 \cdot R_2}{R_5 + R_2} = \frac{100}{20} = 5 \text{ ohms}$  **0.5 marks**

Now R1 and R6 are in series and hence the final equivalent resistance of the entire circuit is  $R = R_1 + R_6 = 12 \text{ ohms}$ . **1 mark**

By Ohm's Law we know that  $V = IR$ , hence  $I = V/R$ .

Hence the current in the circuit is  $24/12 \text{ A} = 2 \text{ A}$  (Final Answer) **1 mark**



(0.5+0.5+1+1)

13. Gas A, found in the upper layers of the atmosphere, is a deadly poison but is essential for all living beings. The amount of this gas started declining sharply in the 1980s.

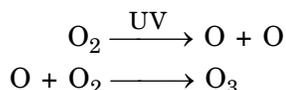
(a) Identify Gas A. How is it formed at higher levels of the atmosphere?

(b) Why is it essential for all living beings? State the cause for the depletion of this gas. **3**

Ans. (a) Gas A is Ozone. Alternatively accept the formula of the gas. (½ Mark)

Ozone at the higher levels of the atmosphere is a product of 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 molecular oxygen to form ozone. (1 Mark)

Alternatively accept the following equations with the correct molecular formulae. No mark to be assigned if molecular formulae are not correct, when only the equation is written.



(b) Ozone shields the surface of the earth/protects living organisms from ultraviolet (UV) radiation released by the sun. (½ Mark)

Chlorofluorocarbons (CFCs) (½ Mark)

which are used as refrigerants/in fire extinguishers (½ Mark)  
 lead to depletion of ozone layer.

**SECTION-C**

This section has 02 case-based questions (14 and 15). Each case is followed by 03 sub-questions [(a), (b) and (c)]. Parts a and b are compulsory. However, an internal choice has been provided in part (c).

14. Sahil performed an experiment to study the inheritance pattern of genes. He crossed tall pea plants (TT) with short pea plants (tt) and obtained all tall plants in F1 generation.

(a) What will be set of genes present in the F1 generation? (1 Mark)

(b) Give reason why only tall plants are observed in F1 progeny. (1 Mark)

(c) When F1 plants were self-pollinated, a total of 800 plants were produced. How many of these would be tall, medium height or short plants? Give the genotype of F2 generation. (2 Marks)

Ans. (a) Tt

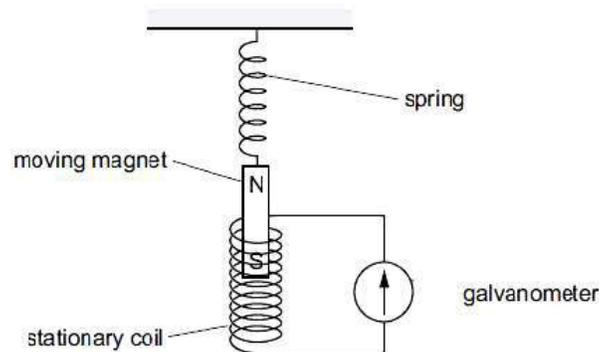
- (b) Traits like 'T' are called dominant traits, while those that behave like 't' are called recessive traits./ Alternatively accept the definition of dominant and recessive traits with examples of T and t respectively/Alternatively accept the law of Dominance with examples of T and t. (1 Mark)
- (c) Out of 800 plants 600 plants will be tall and 200 plants will be small (1 Mark)  
 $1 TT : 2Tt : 1tt$  (1 Mark)

**Or**

**When F1 plants were cross-pollinated with plants having tt genes, a total of 800 plants were produced. How many of these would be tall, medium height or short plants? Give the genotype of F2 generation.**

**Ans.** In the cross between Tt X tt, 400 Tall (Tt) and 400 short (tt) plants will be produced. (1 Mark)  
 $1Tt : 1tt$  (1 Mark)

- 15. Ansari Sir was demonstrating an experiment in his class with the setup as shown in the figure below.**



**A magnet is attached to a spring. The magnet can go in and out of the stationary coil. He lifted the Magnet and released it to make it oscillate through the coil. Based on your understanding of the phenomenon, answer the following questions.**

- (a) What is the principle which Ansari Sir is trying to demonstrate?
- (b) What will be observed when the Magnet starts oscillating through the coil. Explain the reason behind this observation.
- (c) Consider the situation where the Magnet goes in and out of the coil. State two changes which could be made to increase the deflection in the galvanometer. 4

**Ans.** (a) Sir is trying to demonstrate the principle of Electromagnetic induction. (1 Mark)

(b) There will be induced current in the coil due to relative motion between the magnet and the coil. Changing the magnetic field around the coil generates induced current. ( $\frac{1}{2} + \frac{1}{2}$  Mark)

(c) Using a stronger magnet, using a coil with more number of turns. (2 Marks)

**Or**

**Is there any difference in the observations in the galvanometer when the magnet swings in and then out of the stationary coil? Justify your answer.**

**Ans.** When the magnet moves into the coil, the ammeter shows a momentary deflection towards one side say left. ( $\frac{1}{2}$  Mark)

When the magnet moves out of the coil, the ammeter shows a momentary deflection now towards right. ( $\frac{1}{2}$  Mark)

This is due to changing magnetic field/flux associated with the coil as the magnet moves in and out. Alternatively, the flux increases when the magnet goes in and it decreases when the magnet goes out. (1 Mark)

# Reliable SAMPLE QUESTION PAPER

# 2

SCIENCE (TERM-II)

Maximum Marks : 40

CLASS-X

Time allowed : 2 Hours

## General Instructions :

- (i) All questions are compulsory.
- (ii) The question paper has three sections and 15 questions. All questions are compulsory.
- (iii) Section-A has 7 questions of 2 marks each; Section-B has 6 questions of 3 marks each; and Section-C has 2 case based questions of 4 marks each.
- (iv) Internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.

### SECTION-A

1. (a) Write full form of DNA.  
(b) Why are variations essential for the species ? 2
2. An elephant learns a trick at the circus. Will his offsprings also know the trick by birth ? Support your answer with reasons. 2
3. (i) List two reproductive parts of a flower.  
(ii) How is a unisexual flower different from a bisexual flower ? State in brief. 2

Or

What will happen when :

- (a) a mature *Spirogyra* filament attains considerable length ?
  - (b) *Planaria* gets cut into two pieces ?
4. In an experiment to study the relationship between the potential difference across a resistor and the current through it a student recorded the following observations :

Potential difference (V)	2	3	4.5	5	6
Current (A)	0.08	0.12	0.15	0.20	0.24

Find in which one of the above sets of reading the trend is different from others and must be rejected. Calculate the mean value of resistance of the resistor based on the remaining sets of readings. 2

5. Identify the poles of the magnet in the given Fig. (i) and (ii). 2

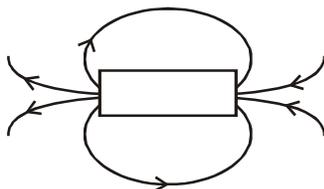


Fig. (i)

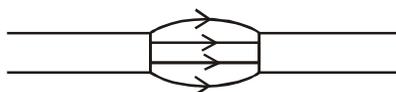
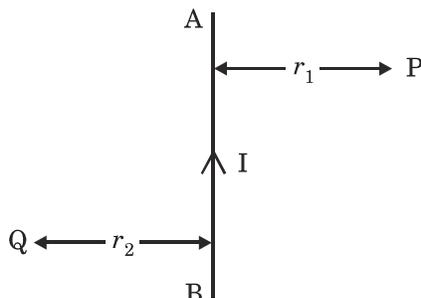


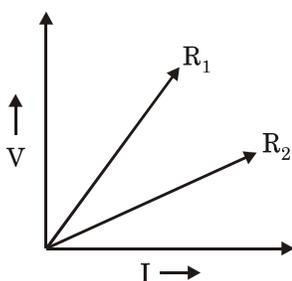
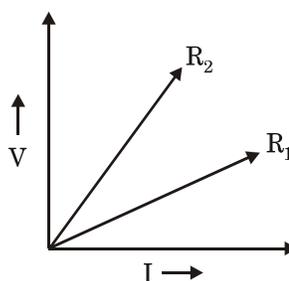
Fig. (ii)

**Or**

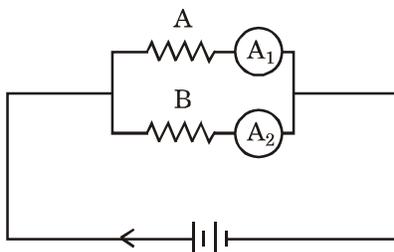
AB is a current carrying conductor in the plane of the paper as shown in Figure. What are the directions of magnetic fields produced by it at points P and Q? Given  $r_1 > r_2$ , where will the strength of the magnetic field be larger?



6. Two students perform experiments on two given resistors  $R_1$  and  $R_2$  and plot the following V-I graphs. If  $R_1 > R_2$ , which of two diagrams correctly represent the situation on the plotted curves? Justify your answer. 2

**Diagram 1****Diagram 2****Or**

In the circuit diagram shown, the two resistance wires A and B are of same length and same material, but A is thicker than B. Which ammeter  $A_1$  or  $A_2$  will indicate higher reading for current? Give reason.



7. (a) What are decomposers?  
 (b) State in brief the role of decomposers in the environment. 2

**SECTION-B**

8. What is homologous series of organic compounds? Write its two characteristics. Give an example of homologous series. 3
9. State Modern Periodic Law. Mention the positions of (i) hydrogen and (ii) isotopes of same element in the Modern Periodic Table. 3

**Or**

A part of the Periodic Table has been shown below :

<b>Group →</b>	1	2			13	14	15	16	17	18
<b>Period ↓</b>										
1										
2	A	C							E	G
3	B					D			F	

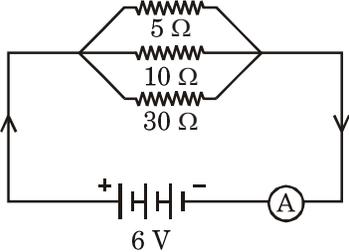
Answer the following questions on the basis of position of elements in the above table :

- (i) Which element is a noble gas ? Give reason.
- (ii) Which element is most electronegative ? Give reason.
- (iii) Write the electronic configurations of (a) B and (b) E.
10. Briefly explain the role of natural selection and genetic drift in speciation by citing an example. **3**

**Or**

Study the given data and answer the questions that follow :

1	2	3
Parental plant cross fertilized and seeds collected.	F1 generation offspring	F2 generation offspring after self-pollination of F1 hybrid.
Male parent – Round green seeds.	All seeds – Round Yellow	314 – Round yellow 110 – Round green
Female parent – Wrinkled yellow seeds.		102 – Wrinkled yellow 32 – Wrinkled green

- (a) What is the term given to this type of cross ?
- (b) What does the data in column 2 indicate ?  
State how you arrived at this conclusion.
11. 
- (a) For the circuit shown above in the diagram, calculate :
- (i) Value of current through the 30V resistor.
- (ii) Total resistance of the circuit.
- (b) Give two advantages of connecting electrical devices in parallel with battery. **3**
12. (a) Describe an activity to draw a magnetic field line outside a bar magnet from one pole to another. **3**
- (b) List any two properties of magnetic field lines. **3**
13. State in brief two ways in which non-biodegradable substances would affect the environment. List two methods of safe disposal of the non-biodegradable waste. **3**

**SECTION-C**

**This section has 02 case-based questions (14 and 15). Each case is followed by 03 sub-questions [(a), (b) and (c)]. Parts (a) and (b) are compulsory. However, an internal choice has been provided in part (c).**

**14. Carbon : Covalent Bonding in Carbon**

All things around us, like our food, clothes, medicines, books, including all living structures etc. are based on carbon. The earth's crust has only 0.02% carbon in the form of minerals and it is 15th most abundant substance in the earth's crust. It is the 4th most abundant substance in universe. Compounds having carbon atoms among the components are known as carbon compounds. Previously, carbon compounds could only be obtained from a living source; hence they are also known as organic compounds. The atomic number of carbon is 6. Its electronic configuration is 2, 4. It requires 4 electrons to achieve the inert gas electronic configuration. But carbon cannot form an ionic bond. Bond formed by sharing of electrons is called covalent bond. Two or more atoms share electrons to make their configuration stable. In this type of bond, all the atoms have similar rights over shared electrons. Compounds which are formed because of covalent bond are called covalent compounds. Carbon is a versatile element, because it can form single, double, and triple bonds. It can also form chains, branched chains, and rings when connected to other carbon atoms.

- (a) **How does the carbon atom attain the configuration of noble gas? (1 Mark)**  
 (b) **Why does carbon form strong bonds with most other elements? (1 Mark)**  
 (c) **Explain in brief two main reasons for carbon forming a large number of compounds. (2 Marks)**

*Or*

**Compounds which are formed because of covalent bond are called covalent compounds. Give two important physical properties of covalent compounds of carbon.**

**15. Modes of Reproduction used by Single Organisms**

Asexual reproduction is a mode of reproduction in which a new offspring is produced by a single parent, without the fusion of gametes or change in the number of chromosomes. The new individuals produced are genetically and physically identical to each other, *i.e.*, they are the clones of their parent. It is observed in all unicellular organisms, some multicellular organisms and a few plants. The different types of asexual reproduction are : Binary/Multiple fission (common in most of the unicellular organisms), budding (small cyst-like structure is formed on the parent's body), regeneration (growing back the lost organ or body part by the organism), vegetative propagation (vegetative part of the plant, like leaves, stem, roots, gives rise to a new plant), fragmentation (each fragmented piece grows into a whole new organism) and spore formation (organisms make spores that can grow into complete new individuals) etc. There are many advantages as well as disadvantages of asexual reproduction.

- (a) **Why DNA copying is considered an essential part of the process of reproduction?**  
 (b) **Justify the statement "The new individuals produced in asexual reproduction are the clones of their parent".**  
 (c) **Write two ways through which the variation helps in survival of the organism. 4**

*Or*

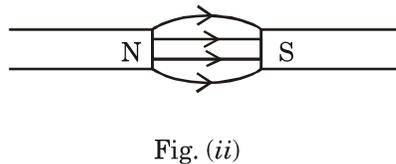
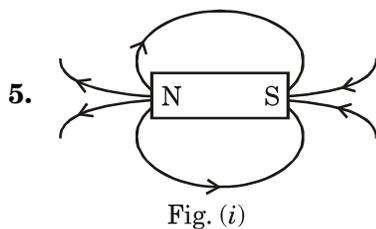
**Give an example for each method of asexual reproduction which takes place through (i) a small cyst-like structure is formed on the parent's body (ii) Each fragmented piece grows into a whole new organism (iii) Vegetative part of the plant (leaves), gives rise to a new plant (iv) Organisms make spores that can grow into complete new individuals.**

1. DNA copying in reproduction leads to
- (a) transmission of characters from parents to offsprings. 1
  - (b) variations. 1
2. ● Elephant's offsprings will not inherit this trait.  
● An acquired trait is not inherited from one generation to next generation. Only genetic traits are inherited.
3. (i) Reproductive parts of a flower : ½  
Stamen (male part) ½  
Pistil/Carpel (female part) ½  
(ii) Unisexual flower has either stamen or carpel in it/only male or female part. Bisexual flower has both stamen and carpel/both male or female part. ½

**Or**

- (a) Filament will break into smaller fragments and each fragment will give rise to a new filament. 1  
(b) Each piece will regenerate (important to mention) into new *Planaria*. 1
4. Reading of different trend 4.5 V; 0.15 A must be rejected. 1

$$R_1 = \frac{2 \text{ V}}{0.08 \text{ A}} = 25 \Omega, R_2 = R_4 = R_5 = 25 \Omega \text{ mean} = 25 \Omega. \quad 1$$



1+1

**Or**

- Into the plane of paper at P and out of it at Q. The strength of the magnetic field is larger at the point located closer, i.e., at Q. 1x2
6. Diagram 1. ½  
Slope of the graph = R ½  
Since slope of  $R_1$  is greater in diagram 1 than  $R_2$ , it is the correct representation as per given situation. 1

**Or**

- Ammeter  $A_1$  will show higher reading. 1  
Because, as wire A is thicker than B, A has lesser resistance. So high current will be drawn by A from the battery and hence ammeter  $A_1$  will show higher reading. 1
7. (a) **Decomposers** : They are those microorganisms that obtain energy from the chemical breakdown of dead organisms or animals or plant wastes. 1  
(b) **Role of decomposers** : Decomposers breakdown complex organic substances into simpler inorganic substances that go into the soil and are used up by the plants. 1

8. (i) **Homologous series** : A series of compounds of carbon in which same functional group substitutes for hydrogen is known as homologous series.
- (ii) (a) The two adjacent members of homologous series differ from each other by a group :  $\text{CH}_2$ .  
 (b) The atomic masses of two adjacent members of homologous series differ from each other by 14 u.
- (iii) Example : Alkane series :  $\text{CH}_3\text{OH}$ ,  $\text{C}_2\text{H}_5\text{OH}$ ,  $\text{C}_3\text{H}_7\text{OH}$ ,  $\text{C}_4\text{H}_9\text{OH}$  1+1+1
9. (a) Statement of Modern Periodic Law. 1
- (b) (i) Position of H : 1st group, 1st period.  
 (ii) Position of isotopes : same group and period. 4×½=2

**Or**

- (i) G : It is a noble gas and has zero valency.  
 (ii) E, smallest atomic size and more electron affinity.  
 (iii) (a) 2, 8, 1; (b) 2, 7 1+1+1
10. ● Illustration through variation in beetle population. 1  
 ● Natural selection – Providing survival advantage. 1  
 ● Genetic drift – Alteration in gene frequency by chance factor, *i.e.*, accidental survival of a particular type of beetle. 1

**Or**

- (a) Dihybrid cross. 1  
 (b) Round shape and yellow colour in the pea plants are the dominant traits. 1+1

11. (a) (i)  $I = \frac{V}{R}$

$$I = \frac{6 \text{ V}}{30 \Omega} = \frac{1}{5} = 0.2 \text{ A}$$

- (ii) Total R resistors in parallel 1

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

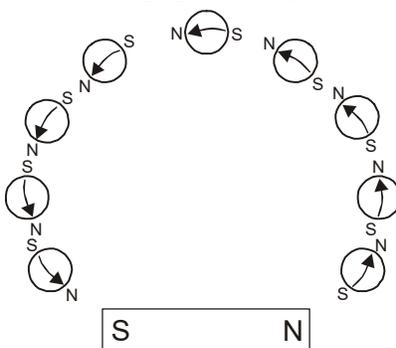
$$= \frac{1}{5} + \frac{1}{10} + \frac{1}{30}$$

$$\frac{1}{R} = \frac{10}{30}$$

$$\therefore R_p = 3 \Omega$$

- (b) (i) Each appliance gets the same applied voltage across it. 1  
 (ii) Each appliance gets different current depending on its resistance.

12. (a) (i) Place a bar magnet on a sheet of paper and place a compass near the north pole.



(ii) Mark the position of the needle.

(iii) Move the needle such that its south pole occupies the space occupied by the north pole previously.

(iv) Continue till the needle reaches the south pole.

(v) Join the dots to obtain the field line.

2

(b) (i) No two magnetic field lines intersect each other.

 $\frac{1}{2} \times 2 = 1$ 

(ii) Magnetic field lines move from N to S outside and S to N inside magnet.

13. ● The non-biodegradable substances affect the environment in the following ways :

(i) They persist in the environment for a long time and thus damage the environment.

(ii) They cause land and water pollution.

● **Methods of safe disposal of the non-biodegradable waste :**

(i) By underground dumping.

(ii) By sending into factories for recycling.

14. (a) Carbon shares its valence electrons with carbon or with atoms of other elements for attaining the noble gas configuration.

(b) Carbon forms strong bonds with most other elements because of its small size, enabling the nucleus to hold on to the shared pairs of electrons strongly.

(c) The reasons for the formation of large number of compounds are :

1. **Tetravalency** : As carbon has 4 electrons in its valence shell and hence can share its four electrons with different atoms or molecules to form large numbers of compounds.

2. **Catenation** : Catenation is the property of self-linking or binding ability of an atom through covalent bonds to form ring or an endless (branched or straight) long chain. This leads to the large number of organic compounds.

**Or**

1. Carbon compounds have low melting and boiling points because force of attraction between their molecules is not very strong.

2. Carbon compounds are non-conductors of electricity because they do not contain ions.

15. (a) DNA copying is considered an essential part of the process of reproduction, because it carries the genetic information from the parents to offspring.

(b) In asexual reproduction, new offspring are produced by a single parent, without the fusion of gametes or change in the number of chromosomes and so they are an exact copy of their parent.

(c) (i) It helps organisms to adapt to their environment as well as to changes which do occur in the environment.

(ii) It helps a species to emerge strong if favoured by natural selection.

**Or**

(i) *Hydra* and yeast

(Any one)

(ii) Filamentous Cyanobacteria, molds, lichens, sponges, starfish etc.

(Any one)

(iii) *Bryophyllum*

(iv) Fungi like *Rhizopus*, *Mucor*, etc.

(Any one)

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