

CLASS X (2020-21)
SCIENCE (CODE 086)
SAMPLE PAPER-7

Time : 3 Hours

Maximum Marks : 80

General Instructions :

- (i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
 - (ii) Section–A – question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
 - (iii) Section–B – question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.
 - (iv) Section–C – question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.
 - (v) Section–D – question no. 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
 - (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
 - (vii) Wherever necessary, neat and properly labeled diagrams should be drawn.
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SECTION A

Q1. An element 'X' is in group 2 of the periodic table. What will be the formula of its chloride? [1]

OR

How would the tendency to lose electrons change as we go from left to right across a period of the periodic table?

Q2. What is a homologous series of carbon compounds? [1]

Q3. Name a sexually transmitted disease which damages the immune system of human body. [1]

Q4. What is the magnification of the images formed by plane mirrors and why? [1]

Q5. Why are danger signal lights red in colour? [1]

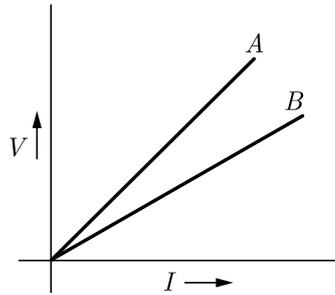
Q6. Define 1 dioptre of power of a lens. [1]

OR

A mirror has magnification 0.4. What type of the mirror is it and what type of the image is formed?

Q7. $V-I$ graph for two wires A and B are shown in the figure. If both wires are of same length and

same thickness, which of the two is made of a material of high resistivity? [1]



Q8. When a magnetic needle is brought near a current carrying conductor, it deflects. Why? [1]

Q9. Name the physical quantity whose unit is JC^{-1} . [1]

OR

A wire of resistance $2\ \Omega$ has been connected to a source of $50\ V$ as its two ends. What is the current flowing through the wire?

Q10. In a bisexual flower, inspite of the young stamens being removed artificially, the flower produces fruit. Provide a suitable explanation for the above situation. [1]

Q11. What will happen to a plant if its xylem is removed? [1]

OR

What is translocation in a plant?

Q12. We do not clean ponds or lakes, but an aquarium needs to be cleaned. Why? [1]

OR

What happens when high energy ultraviolet radiation act on the oxygen at the higher level of the atmosphere?

Q13. Define excretion. [1]

For question numbers 14, 15 and 16, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :

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

Q14. **Assertion :** Diamond is a conductor of electricity and heat. [1]
Reason : Diamond is soluble in all known solvents.

Q15. **Assertion :** The enzymes released by micro-organisms help in breaking down biodegradable wastes. [1]
Reason : Biodegradable wastes are generally inorganic wastes.

OR

Assertion : Bacteria and fungi are called decomposers.

Reason : Bacteria and fungi break down the complex organic substances into simple inorganic substances that enter into the soil and are again used up by the plants.

- Q16. **Assertion :** Herbivores have longer small intestine than carnivores.
Reason : Carnivores can digest cellulose due to the presence of enzyme, cellulose. [1]
- Q17. **Read the following and answer any four question 17.1 to 17.5.** 1 × 4
In human beings, air is taken into the body through the nostrils. From here, the air passes through the throat and into the lungs. Rings of cartilage are present in the throat.
- 17.1** Which of the following prevent collapsing of trachea?
(a) Diaphragm (b) Alveoli
(c) Rings of cartilage (d) Ribs
- 17.2** Which is the correct sequence of air passage during inhalation?
(a) Nostrils → larynx → pharynx → trachea → lungs
(b) Nasal passage → trachea → pharynx → larynx → alveoli
(c) Larynx → nostrils → pharynx → lungs
(d) Nostrils → pharynx → larynx → trachea → alveoli
- 17.3** During respiration exchange of gases take place in:
(a) trachea and larynx (b) alveoli of lungs
(c) alveoli and throat (d) throat and larynx
- 17.4** Which of the following statement(s) is are true about respiration?
I. During inhalation, ribs move inward and diaphragm is raised.
II. In the alveoli, exchange of gases takes place i.e., oxygen from alveolar air diffuses into blood and carbon dioxide from blood into alveolar air.
III. Haemoglobin has greater affinity for carbon dioxide than oxygen.
IV. Alveoli increase surface area for exchange of gases.
(a) I and IV (b) II and III
(c) I and III (d) II and IV
- 17.5** When air is blown from mouth into a test-tube containing limewater, the limewater turned milky due to the presence of:
(a) oxygen (b) carbon dioxide
(c) nitrogen (d) water vapour
- Q18. **Read the following and answer any four questions from 18.1 to 18.5.** 1 × 4
An indicator is a special chemical that changes its colour to indicate the presence of a chemical substance. It is used to confirm the presence of an acid, a base or a neutral solution. Litmus paper is the most commonly used indicator. It is a purple dye which is extracted from a plant 'lichen'. Litmus paper comes in two colours-blue and red.
There are many other natural materials like turmeric, red cabbage leaves, coloured petals of some flowers such as petunia, which indicate the presence of acid or base in a solution. These are called acid-base indicators. These indicators tell us whether a substance is acidic or basic through colour changes.
- 18.1** The indicator which turn red in acid solution are:
(a) turmeric and litmus
(b) phenolphthalein and methyl orange
(c) litmus and methyl orange
(d) phenolphthalein and Litmus
- 18.2** Which of the following is an olfactory indicator?
(a) Litmus (b) Petunia leaves
(c) Turmeric (d) Vanilla essence

19.3 The indicator which produces a pink colour in an alkaline solution is:

- (a) phenolphthalein (b) turmeric
(c) litmus (d) methyl orange

19.4 Litmus is extracted from a plant called:

- (a) Hydrangea (b) Lichen
(c) Geranium (d) Petunia

19.5 Which of the following statements is correct about an aqueous solution of an acid and of a base?

- I. Higher the pH, stronger the acid
II. Higher the pH, weaker the acid
III. Lower the pH, stronger the base
IV. Lower the pH, weaker the base

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

Q19. Read the following and answer any four questions from 19.1 to 19.5.

1×4

Ravi wanted to fix the rear-view mirror of his scooter. He knows that rear-view mirror is an essential safety device in the vehicle and allows him to see objects at the backside of his vehicle.



He bought two mirrors M_1 and M_2 , out of which M_1 is curved inwards and M_2 is curved outwards.

19.1 Based on the given situation, which mirror should Ravi need to fix as his rear-view mirror?

- (a) M_1 (b) M_2
(c) Both M_1 and M_2 (d) None of these

19.2 If R is the radius of curvature of a spherical mirror and f is its focal length, then:

- (a) $R = f$ (b) $R = 2f$
(c) $R = 3f$ (d) $R = \frac{f}{2}$

19.3 What is the formula for magnification obtained with a mirror?

- (a) $\left(\frac{-\text{Image distance}}{\text{Object distance}}\right)$ (b) $2 \times \text{Focal length}$
(c) $\left(\frac{\text{Height of object}}{\text{Height of image}}\right)$ (d) None of these

19.4 Ravi did some preliminary experiment with mirror M_1 and found that magnification of the real image of an object placed at 10 cm in front of it is 3, at what distance is the image located?

- (a) 30 cm (b) $\frac{-10}{3}$ cm
(c) $\frac{10}{3}$ cm (d) -30 cm

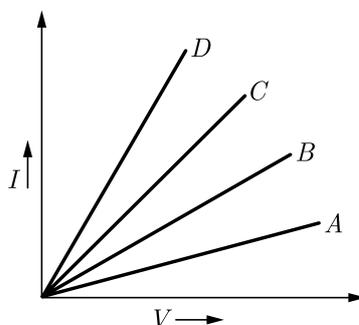
19.5 If the magnification of a mirror has a plus sign, then the nature of image formed by it is:

- (a) real and inverted
(b) virtual and inverted
(c) virtual and erect
(d) real and erect

Q20. Read the following and answer any four questions from 20.1 to 20.5. 1 × 4

Ohm's law gives a relationship between current and potential difference. According to this Law, at constant temperature, the current flowing through a conductor is directly proportional to the potential difference across its ends. The ratio of potential difference applied between the ends of a conductor and the current flowing through it is a constant quantity called resistance.

The following graph is obtained by a researcher while doing an experiment to study Ohm's law. The I - V graph for four conductors A, B, C and D having resistance R_A, R_B, R_C and R_D respectively are shown in the graph.



20.1 If all the conductors are of same length and same material, which is the thickest ?

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

20.2 If all the conductors are of same thickness and of same material, which is the longest ?

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

20.3 Which one of the following relations is true for these conductors ?

- (a) $R_A > R_B > R_C > R_D$ (b) $R_A = R_B < R_C < R_D$
 (c) $R_A < R_B < R_C < R_D$ (d) $R_A = R_B = R_C = R_D$

20.4 If conductors A and B are connected in series and I - V graph is plotted for the combination, its slope would be:

- (a) more than that of A (b) between A and B
 (c) more than that of D (d) less than that of A

20.5 If conductors C and D are connected in parallel and I - V graph is plotted for the combination, its slope would be:

- (a) between C and D (b) lesser than that of A
 (c) more than that of D (d) between B and C

SECTION-B

Q21. Write any two differences between the two ways of oxidation of glucose in organisms. [2]

OR

- (i) State two functions of stomata.
 (ii) How do guard cells regulate the opening and closing of stomatal pore?

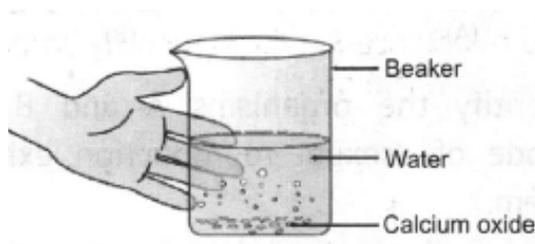
Q22. (i) Trace the movement of oxygenated blood in the body. [2]
 (ii) Write one structural difference between the composition of artery and vein.

Q23. What is the difference between displacement and double displacement reactions? Write equations for these reactions. [2]

OR

What happens when hydrogen gas is passed over the heated copper oxide? Write the chemical equation involved in this reaction.

Q24. In order to illustrate a combination reaction, a teacher take about 2 g to 3 g of calcium oxide in a glass beaker and pour water over it very slowly.



Based on the given information:

(i) Write the chemical reaction involved in this process.

(ii) One of the student observed that water started boiling even when the solution was not being heated. Give reason for his observation. [2]

Q25. A student observes a dish antenna which is used to receive television signals from a satellite. What is the nature of the curved dish? Where should the antenna be positioned to receive the strongest possible signals? [2]

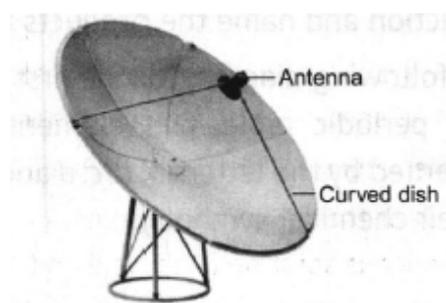


Figure : A dish Antenna

Q26. What is meant by periodicity of properties of elements? Why are the properties of elements placed in the same group of the periodic table similar? [2]

SECTION-C

Q27. In a monohybrid cross between tall pea plants (TT) and short pea plants (tt) a scientist obtained only tall pea plants (Tt) in the F_1 generation. However, on selfing the F_1 generation pea plants, he obtained both tall and short plants in F_2 generation. On the basis of above observation with other angiosperms also, can the scientist arrive at a law? If yes, explain the law, if not, give justification for your answer. [3]

OR

Explain Mendel's experiment with peas on inheritance of characters, considering only one visible contrasting character.

- Q28. Give reason to justify the following: [3]
 (i) The existence of decomposers is essential in a biosphere.
 (ii) Flow of energy in a food chain is unidirectional.
- Q29. What are the different ways in which glucose is oxidised to provide energy in various organisms? [3]
- Q30. 2 g ferrous sulphate crystals are heated in a dry boiling tube. [3]
 (i) List any two observations.
 (ii) Name the type of chemical reaction taking place.
 (iii) Write balanced chemical equation for the reaction and name the products formed.
- Q31. In the following diagram for the first three periods of the periodic table, five elements have been represented by the letters *a, b, c, d* and *e* (which are not their chemical symbols): [3]

1							18
	2	13	14	15	16	17	
			<i>a</i>			<i>b</i>	
	<i>c</i>				<i>d</i>		<i>e</i>

- (i) Select the letter which represents a halogen.
 (ii) Select the letter which represents a noble gas.
 (iii) What type of bond is formed between *a* and *b*?
- Q32. Explain the nature of the covalent bond using the bond formation in CH_3Cl . [3]
- Q33. A convex lens of focal length 25 cm and a concave lens of focal length 10 cm are placed in close contact with one another. [3]
 (i) What is the power of this combination?
 (ii) What is the focal length of this combination?
 (iii) Is this combination converging or diverging?

SECTION-D

- Q34. (i) The electronic configurations of some elements are given below:

Element	Electronic configuration		
	<i>K</i>	<i>L</i>	<i>M</i>
<i>A</i>	2	8	7
<i>B</i>	2	8	1
<i>C</i>	2	8	8
<i>D</i>	2	8	2
<i>E</i>	1		

Which of these are metals?

- (ii) *P, Q* and *R* are 3 elements which undergo chemical reactions according to the following equations:
 A. $\text{P}_2\text{O}_3 + 2\text{Q} \longrightarrow \text{Q}_2\text{O}_3 + 2\text{P}$.
 B. $3\text{R}\text{SO}_4 + 2\text{Q} \longrightarrow \text{Q}_2(\text{SO}_4)_3 + 3\text{R}$.
 C. $3\text{RO} + 2\text{P} \longrightarrow \text{P}_2\text{O}_3 + 3\text{R}$.

Answer the following question :

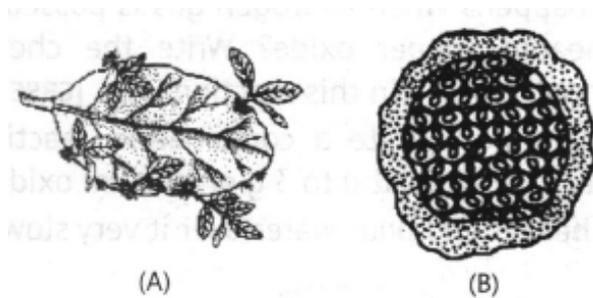
- (a) Which element is most reactive?
 (b) Which element is least reactive?
 (c) State the type of reaction listed above. [5]

OR

Write equations for the reactions, if any, between:

- (i) iron and steam.
- (ii) calcium and potassium with water.
- (iii) zinc and silver nitrate solution.
- (iv) magnesium and iron(II) chloride solution.

Q35.

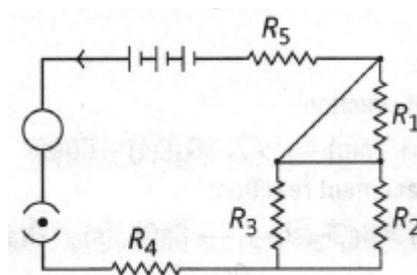


- (i) Identify the organisms *A* and *B* and the mode of asexual reproduction exhibited by them.
- (ii) How will an organism be benefited if it reproduces through spores?
- (iii) Mention the two asexual methods by which Hydra can reproduce. Explain briefly any one such method. [5]

Q36. With the help of a diagram of experimental set-up describe an activity to show that the force acting on a current carrying conductor placed in a magnetic field increase with increase in field strength.

OR

Deduce the expression for the equivalent resistance of the parallel combination of three resistors R_1 , R_2 and R_3 .



Consider the following electric circuit:

- (i) Which two resistors are connected in series?
- (ii) Which two resistors are connected in parallel?
- (iii) If every resistor of the circuit is of $2\ \Omega$, what current will flow in the circuit? [5]

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