

CLASS X (2019-20)
SCIENCE (CODE 086)

Time : 3 Hours

Maximum Marks : 80

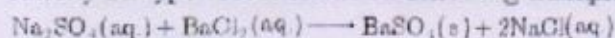
General Instructions :

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
 - (ii) All questions are compulsory.
 - (iii) Internal choice is given in each sections.
 - (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
 - (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
 - (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
 - (vii) This question paper consists of a total of 30 questions.
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SECTION A

Q1. Name the part of the human eye that helps in changing the focal length of the eye lens. [1]

Q2. Identify the type of reaction in the following example. [1]



Q3. Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.

Another traditional source of energy was the kinetic energy of flowing water or the potential energy of water at a height. Hydro-power plants convert the potential energy of falling water into electricity. Since there are very few waterfalls, which could be used as a source of potential energy, hydro-power plants are associated with dams. In the last century, a large number of dams were built all over the world. Hydro-power plants meet a quarter (25%) of our energy requirement in India.

In order to produce hydroelectricity, high-rise dams are constructed on the river to obstruct the flow of water and thereby collect water in larger reservoirs. The water level rises and in this process the kinetic energy of flowing water gets transformed into potential energy. The water from the high level in the dam is carried through pipes, to the turbine, at the bottom of the dam. Since the water in the reservoir would be refilled each time it rains (hydro power is a renewable source of energy) we would not have to worry about hydroelectricity sources getting used up the way fossil fuels would get finished on day. But, constructions of big dams have certain problems associated with it. The dams can be constructed only in a limited number of places, preferably in hilly terrains. Large areas of agricultural land and human habitation are to be sacrificed as they get submerged. Large eco-systems are destroyed when submerged under the water in dams. The vegetation which is submerged rots under anaerobic conditions and gives rise to large amounts of methane which is also a green-house gas. It creates the problem of satisfactory rehabilitation of displaced people. Opposition to the construction of Tehri Dam on the river Ganga and Sardar Sarovar project on the river Namada are due to such problems.

3.1 What percentage of our energy requirements is met by hydroelectric power ? [1]

3.2 What sort of transformation in energy occurs in a hydroelectric plant ? [1]

3.3 What problems are associated with construction of dams ? [1]

3.4 What type of energy is hydro power ? [1]

Q4. Answer question numbers 4.1-4.4 on the basis of your understanding of the following paragraph and the related studied concepts.

Is there a relationship between the radius of curvature R , and focal length f , of a spherical mirror ? For spherical mirrors of small apertures, the radius of curvature is found to be equal to twice the focal length. We put this as $R = 2f$. This implies that the principal focus of a spherical mirror lies midway between the pole and centre of curvature.

4.1 Write relation between radius of curvature and focal length. [1]

4.2 For which type of mirrors above relation is verified? [1]

4.3 The size of the aperture should be? [1]

- (a) small (b) large
(c) neither small nor large (d) None of these

4.4 Principal focus of a spherical mirror is lies [1]

- (a) midway between the pole and centre of curvature
(b) near the pole
(c) near the centre of curvature
(d) None of these

Q5. Where should an object be placed in front of a convex lens to get a real image of the same size of the object ? [1]

- (a) At the principal focus of the lens
(b) At twice the focal length
(c) At infinity
(d) Between the optical centre of the lens and its principal focus.

Q6. What is the current through a 5.0 ohm resistor if the voltage across it is 10 V [1]

- (a) zero (b) 0.5 A
(c) 2.0 A (d) 5.0 A

Q7. The image formed by a concave mirror is observed to be virtual, erect and larger than object. [1]
The position of the object should be

- (a) between the principal focus and the centre of curvature
(b) at the centre of curvature
(c) beyond the centre of curvature
(d) between the pole of the mirror and its principal focus.

Q8. In the experiment to show that CO_2 is given out during respiration, the student uses : [1]

- (a) lime water (b) alcohol
(c) KOH solution (d) iodine solution

OR

Samir observed that when he washed his clothes a sample of water, scum is formed. Those scum's are [1]

- (a) calcium salts of long chain of carboxylic acid
(b) magnesium salts of long chain of carboxylic acid
(c) lead salt of long chain of carboxylic acid
(d) either (a) or (b)

- Q9. A student strongly heats hydrated ferrous sulphate salt in a dry test tube. He would observe a : [1]
(a) yellow residue (b) brown residue
(c) light green residue (d) white residue
- Q10. To prepare a temporary mount of a leaf peel for observing stomata, the chemicals used for staining and mounting respectively are : [1]
(a) safranin and iodine (b) safranin and glycerine
(c) iodine and safranin (d) glycerine and iodine
- Q11. A student observes binary fission in Amoeba. On the basis of his observation he may conclude that the binary fission in Amoeba starts with the : [1]
(a) constriction of its cell membrane
(b) elongation of its nucleus
(c) bulb like projection in the parent body
(d) two Amoeba coming closer to each other
- Q12. A salt reacts with ethanoic acid with a lot of effervescence and liberation of colourless gas which turns lime water milky. This salt could be : [1]
(a) sodium ethanoate (b) sodium chloride
(c) sodium hydrogen carbonate (d) sodium hydroxide

OR

A thin plate of zinc metal is placed in a beaker containing aqueous ferrous sulphate solution. The zinc plate is taken out after 15 minutes. The colour of the solution changes to : [1]

- (a) deep yellow (b) deep green
(c) light blue (d) colourless

(Q.no 13 to 14) In each of the following questions, a statement of Assertion is given by the corresponding statement of Reason. Of the statements, mark the correct answer as.

- (a) If assertion is true and reason is correct explanation of assertion.
(b) If assertion is true but reason is false.
(c) If assertion is false but reason is true.
(d) If both are false.

- Q13. **Assertion :** A lemon kept in water in a glass tumbler appears to be bigger than its actual size.
Reason : When a ray of light passes from denser medium to rarer medium then it bends away from the normal. [1]

- Q14. **Assertion :** Clear sky appears blue.
Reason : Blue colour of light has smaller wavelength, so it scatters more in upper layer of atmosphere in comparison to the other layers. [1]

SECTION B

- Q15. An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields an organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formula. What happens when 'A' and 'B' react in the presence of an acid catalyst? Write the chemical equation for the reaction. [3]
- Q16. State the reactions, if any of the following metals react with lead nitrate solution. In case a reaction takes place, support it by a chemical equation.

(i) Silver (ii) Zinc, (iii) Copper, and (iv) Iron. [3]

OR

Write fully balanced equations for the following reactions.

- Copper (II) oxide and dil. nitric acid
- Aluminium hydroxide and dil. sulphuric acid.
- Magnesium hydrogen carbonate and dil. hydrochloric acid [3]

- Q17. i. Distinguish between esterification and Saponification reactions of organic compounds.
ii. With a labelled diagram describe an activity to show the formation of an ester. [3]

- Q18. List and describe in brief any three ways devised to avoid pregnancy [3]

OR

What are sexually transmitted diseases? Name four such diseases. Which one of them damages the immune system of human body? [3]

- Q19. What important properties of aluminium are responsible for its great demand in the industry? [3]

- Q20. Name the functions of some phytohormones. [3]

- Q21. Which is the main thinking part of the brain? State how it functions. [3]

- Q22. Resistivity of two elements A and B are $= 1.62 \times 10^{-6} \Omega m$ and $520 \times 10^{-6} \Omega m$ respectively. Out of these two, name the element that can be used to make: [3]

- filament of electric bulb.
- wires for electrical transmission lines. Justify your answer in each case.

- Q23. i. What is the function of an electric switch in an electric circuit?
ii. Why is the switch placed in the live wire, which is connected to an appliance?
iii. What consequences will follow, if the switch is placed in the neutral wire? [3]

- Q24. A 5.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30 cm. By calculation determine (i) the position and (ii) the size of the image formed. [3]

OR

An object is 2 m away from a lens, which forms an erect image one-fourth the size of the object. Determine the focal length of the lens. What type of lens is this? [3]

SECTION C

- Q25. State the limitations of a balanced chemical equation. [5]

OR

- Distinguish between 'roasting' and 'calcination'. Which of these two is used for sulphide ores and why?
- Write a chemical equation to illustrate the use of aluminium for joining cracked railway lines.
- Name the anode, the cathode and the electrolyte used in the electrolytic refining of impure copper. [5]

- Q26. Atoms of seven elements A, B, C, D, E, F and G have a different number of electronic shells but have the same number of electrons in their outermost shells. The elements A and C combine with chlorine to form an acid and common salt respectively. The oxide of element A is a liquid at room

temperature and is a neutral substance, while the oxides of the remaining six elements are basic in nature. Based on the above information answer the following questions.

- What could the element A be ?
- Will elements A to G belong to the same period or same group of the periodic table ?
- Write the formula of the compound formed by the reaction of element A with oxygen.
- Show the formation of the compound by a combination of element C with chlorine with the help of an electronic structure.
- What would be the ratio of the number of combining atoms in a compound formed by the combination of element A with carbon ?
- Which one of the given elements is likely to have the smallest atomic radius ? [5]

Q27. Draw a neat diagram of the human male reproductive system and label the parts performing the following functions :

- Production of sperms
- Gland which provides fluid
- Provides low temperature for the formation of sperms
- Common passage for sperms and urine.

Name a sexually transmitted disease and a method to avoid it. [5]

- Q28. i. Draw a sectional view of the human heart and label on it Aorta, Pulmonary arteries, Vena cava, Left ventricle.
- ii. Why is double circulation of blood necessary in human beings ? [5]

OR

- Explain the process of nutrition in Amoeba with suitable diagram.
- During one cycle how many times blood goes to heart of fish and why ? [5]

- Q29. i. Define 1 dioptre of power. Find the focal length of a lens of power -2.0 D.
- ii. Why does a lemon kept in water in a glass tumbler appear to be bigger than its actual size ?
- iii. Study the table given below and state the medium in which light ray will travel fastest. Why ? [5]

Medium	A	B	C
Refractive Index	1.33	1.5	2.4

- Q30. Explain the underlying principle and working of an electric generator by drawing a labelled diagram. What is the function of brushes ? [5]

OR

Find out the following in the electric circuit given in Figure.

- Effective resistance of two 8Ω resistors in the combination.
- Current flowing through 4Ω resistor.
- Potential difference across 4Ω resistor.
- Power dissipated in 4Ω resistor.
- Difference in ammeter readings, if any. [5]

