

**CLASS X (2020-21)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-4**

**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. How will the tendency to gain electrons change as we go from left to right across a period ? Why ? [1]

**OR**

Out of the three elements P, Q and R having atomic numbers 11, 17 and 19 respectively, which two elements will show similar properties and why?

Q2. A shiny brown coloured element X' on heating in air becomes black in colour. Name the element X' and the black compound formed. [1]

Q3. Why do ionic compounds have high melting point? [1]

Q4. The radius of curvature of a spherical mirror is 20 cm. What is its focal length? [1]

Q5. Write down four important characteristics of image formed by a plane mirror. [1]

Q6. What is twinkling of stars due to? [1]

**OR**

Name the two phenomena involved in the formation of rainbow.

Q7. State the observation made by Oersted on the basis of his experiment with current carrying

conductors. [1]

Q8. What constitutes the field of a magnet? [1]

Q9. What happens to the resistance of a conductor when temperature is increased? [1]

**OR**

Out of the two, a toaster of 1 kW and an electric heater of 2 kW, which has a greater resistance?

Q10. Name mode of nutrition in the following organisms:

a. Fungi

b. Amoeba [1]

Q11. What will happen to a plant shoot if sunlight falls on it from one direction only? What do you call this movement? [1]

**OR**

How is spinal cord protected?

Q12. Mendel observed a contrasting trait in relation to position of flowers. Mention the trait. [1]

**OR**

Name the term used for the traits that are exhibited externally.

Q13. Mention two ways in which food gets oxidized in organisms. [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 :** Copper reacts with silver nitrate solution.

**Reason :** Copper is placed higher in the metal activity series than silver. Thus, it can displace silver from silver nitrate solution [1]

Q15. **Assertion :** A mineral is called ore, when metal is extracted from it conveniently and economically.

**Reason :** All ores are minerals but all minerals are not ores.

**OR**

**Assertion :** Gold is isolated from other impurities by Arndt forest cyanide process.

**Reason :** The cyanide which is used here dissolve all possible impurities. [1]

Q16. **Assertion :** Reflex actions are automatic and rapid responses to stimuli.

**Reason :** These actions are controlled by brain. [1]

Q17. **Read the following and answer any four question from (17.1) to (17.5) :** 1 × 4

S. No.	Solution	pH limit
1.	Saliva	6.5-7.5
2.	Lemon juice	2.2-2.4

3.	Tomato juice	4.0-4.4
4.	Coffee	4.5-5.5

17.1 When drops of tomato juice are dropped on litmus paper than litmus paper will turn

- (a) red (b) yellow  
(c) green (d) black

17.2 The nature of saliva in given table is

- (a) acidic (b) basic  
(c) Neither acidic nor basic (d) cannot be define

17.3 The effect of acid on litmus paper is

- (a) blue to red in colour (b) red to blue in colour  
(c) red to green in colour (d) green to red on colour

17.4 The effect of base on litmus paper is

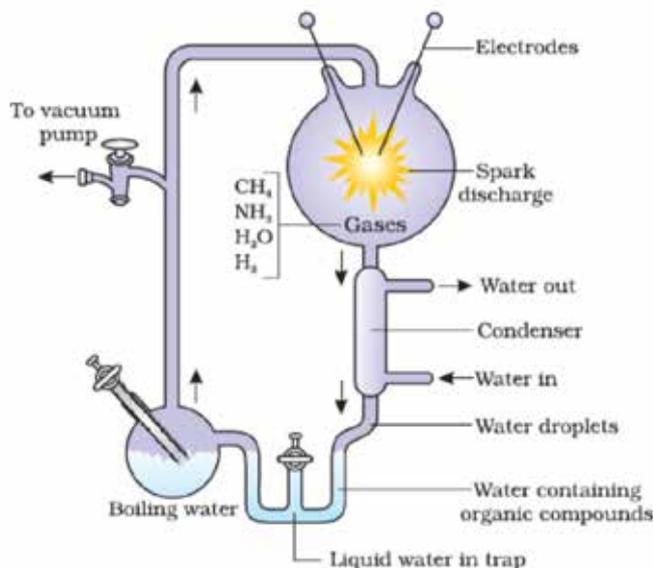
- (a) Turns red litmus to blue in colour (b) Turns blue litmus to blue in colour  
(c) Turns red litmus to orange (d) None of these

17.5 The pH limit of coffee is

- (a) 4.5-5.5 (b) 6.5-7.5  
(c) 1.4-2.5 (d) 2.9-3.9

Q18. Question numbers 18.1-18.4 are based on the given experiment. Study the given experimental setup and answer the questions that follow.

1 × 4



18.1 The name of experiment which is shown in the figure.

- (a) Miler and Urey's experiment (b) Hen's berg experiment  
(c) Millican oil drop experiment (d) None of these

18.2 The gaseous mixture used in the experiment comprised of

- (a) methane, ammonia, hydrogen, water vapours  
(b) methane, nitrogen, hydrogen, water vapours  
(c) ammonia, carbondioxide, nitrogen, water vapours  
(d) methane, ammonia, nitrogen, water vapours

18.3 Under this experiment, electric discharge was created in a closed flask containing mixture of

gases at

- (a) 50°C (b) 250°C  
(c) 800°C (d) 500°C

18.4 The organic compounds found in this experiment is.

- (a) Amino acid (b) HCL  
(c) CCl<sub>4</sub> (d) SO<sub>2</sub>

Q19. Analyse the following observation table showing variation of image-distance ( $v$ ) with object-distance ( $u$ ) in case of a convex lens and answer the questions that follow without doing any calculations : 1 × 4

S.No.	Object-Distance $u$ (cm)	Image-Distance $v$ (cm)
1.	-60	+12
2.	-30	+15
3.	-20	+20
4.	-15	+30
5.	-12	+60
6.	-9	+90

19.1 The focal length of convex lens is

- (a) 5 cm (b) 10 cm  
(c) 15 cm (d) 20 cm

19.2 For what object-distance ( $u$ ) is the corresponding image-distance ( $v$ ) not correct?

- (a) 1<sup>st</sup> observation (b) 2<sup>nd</sup> observation  
(c) 6<sup>th</sup> observation (d) 5<sup>th</sup> observation

19.3 A concave mirror gives real, inverted and same size image if the object is placed

- (a) At focus (b) At infinity  
(c) At C i.e. centre of curvature (d) Beyond centre of curvature

19.4 Focal length of plane mirror is :

- (a) At infinity (b) Zero  
(c) Negative (d) None of these

19.5 The relation between focal length, image distance and object distance is

- (a)  $\frac{1}{v} = \frac{1}{v} - \frac{1}{u}$  (b)  $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$   
(c)  $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$  (d)  $\frac{1}{f} = \frac{1}{u} - \frac{1}{v}$

Q20. Question numbers 20.1-20.5 are based on the table given below. Study the table and answer the following questions. The table given below shows the resistivity of conductors and alloys. 1 × 4

Electrical Resistivity of Some Substances at 20°C

	Material	Resistivity ( $\Omega$ -m)
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Conductors	Silver	$1.60 \times 10^{-8}$
	Copper	$1.62 \times 10^{-8}$
	Aluminium	$2.63 \times 10^{-8}$
	Tungsten	$5.20 \times 10^{-8}$
	Nickel	$6.84 \times 10^{-8}$
	Iron	$10.0 \times 10^{-8}$
	Chromium	$12.9 \times 10^{-8}$
	Mercury	$94.0 \times 10^{-8}$
	Manganese	$1.84 \times 10^{-8}$
Alloys	Constantan (Cu + Ni)	$49 \times 10^{-6}$
	Manganin (Cu+Mn+Ni)	$44 \times 10^{-6}$
	Nichrome (Ni+Cr+Mn+Fe)	$100 \times 10^{-6}$
Insulators	Glass	$10^{10} - 10^{14}$
	Hard rubber	$10^{13} - 10^{16}$
	Ebonite	$10^{15} - 10^{17}$
	Diamond	$10^{12} - 10^{13}$
	Dry paper	$10^{12}$

**20.1** In the given material which one is the better conductor-

- (a) Nickel (b) Copper  
(c) Iron (d) Mercury

**20.2** From the above table, the most popular material used in the heater is

- (a) Copper (b) Nichrome  
(c) Ebonite (d) Nickel

**20.3** The resistance of a copper wire of length 2 m and area of cross-section  $1.7 \times 10^{-6} \text{ m}^2$  is

- (a)  $1.9 \times 10^{-2} \Omega$  (b)  $2 \times 10^{-2} \Omega$   
(c)  $1.6 \times 10^{-2} \Omega$  (d)  $1.5 \times 10^{-2} \Omega$

**20.4** Nichrome is the mixture of-

- (a) Cu + Ni (b) Cu + Mn + Ni  
(c) Ni + Cr + Mn + Fe (d) Ni + Cr

**20.5** In the following insulator which one has the large resistivity-

- (a) Glass (b) Diamond  
(c) Dry paper (d) Ebonite

## SECTION B

Q21. List two ways in which plants can get rid of the wastes.

[2]

OR

What is the role of acid and mucus in stomach?

- Q22. How does feedback mechanism regulate the hormone secretion? [2]
- Q23. Why is lithium with atomic number 3 and potassium with atomic number 19 are placed in group one? What will be atomic number of the first two elements in the second group? [2]

**OR**

Calcium is an element with atomic number 20.

- Will it be a metal/non-metal?
  - What will be its valency?
  - What would be the formula of its chloride?
  - Will it be smaller/larger than K?
- Q24. A gas is liberated immediately with a brisk effervescence, when you add acetic acid to sodium hydrogen carbonate powder in a test tube. Name the gas and describe the test that confirms the identity of the gas. [2]
- Q25. An object of height 4.0 cm is placed at a distance of 30 cm from the optical centre 'O' of a convex lens of focal length 20 cm. Draw a ray diagram to find the position and size of the image formed. Mark optical centre 'O' and principal focus 'F' on the diagram. Also find the approximate ratio of size of the image to the size of the object. [2]
- Q26. Give reason for the following:
- Tungsten used almost exclusively for filament of electric lamp.
  - Why do we use copper and aluminium wires for transmission of electric current? [2]

### SECTION C

- Q27. Give two uses each of the products obtained by the electrolysis of sodium chloride. [3]

**OR**

Name the type of chemical reaction presented by the following equations:

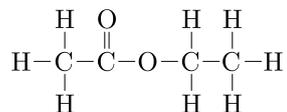
- $\text{CaCO}_3(\text{s}) \xrightarrow{\text{heat}} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
  - $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{Ca}(\text{OH})_2(\text{aq})$
  - $\text{Zn}(\text{s}) + \text{H}_2\text{SO}_4(\text{aq}) \longrightarrow \text{ZnSO}_4(\text{aq}) + \text{H}_2(\text{g})$
- Q28. 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]
- Q29. How do auxins promote the growth of a tendril around a support? [3]
- Q30. What is biodegradable substances? Describe two ways in which non-biodegradable substances affect our environment. [3]
- Q31. (a) Name metals among the first five elements of the Modern Periodic Table.  
(b) Write their symbols.  
(c) Write the formula of their oxides.
- Q32. List and describe in brief any three ways devised to avoid pregnancy. [3]
- Q33. 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]

### SECTION D

Q34. i. The structural formula of an ester is :



Write the structural formulae of the corresponding alcohol and the acid.

ii.

(a) Mention the experimental conditions involved in obtaining ethene from ethanol.

(b) Write the chemical equation for the above reaction.

iii. Explain the cleansing action of soap.

[5]

### OR

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.

i. What could the element A be ?

ii. Will elements A to G belong to the same period or same group of the periodic table ?

iii. Write the formula of the compound formed by the reaction of element A with oxygen.

iv. Show the formation of the compound by a combination of element C with chlorine with the help of an electronic structure.

v. Which one of the given elements is likely to have the smallest atomic radius ?

[5]

Q35. i. What are chromosomes ? Where are they seated ?

ii. What is a sex chromosome ?

iii. Explain the mechanism of sex determination in human beings.

[5]

Q36. i. Two identical resistors each of resistance  $10\ \Omega$  are connected in :

(a) Series

(b) Parallel

in turn to a battery of 6 V. Calculate the ratio of power consumed by the combination of resistor in the two cases

ii. List two factors on which the resistance of a conductor depends.

iii. Write a difference between an ammeter and voltmeter.

[5]

### OR

i. State the commercial unit of electric energy and find its relation with its SI unit.

ii. The current through a resistor is made three times its initial value. Calculate how it will affect the heat produced in the resistor.

iii. Find the amount of heat generated in a conductor if another conductor of double resistance is connected in the circuit keeping all other factors unchanged.

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