CLASS X (2019-20)
SCIENCE (CODE 086)
SAMPLE PAPER-4

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.

SECTION A

Q1. How will the tendency to gain electrons change as we go from left to right across a period ? Why ? [1]

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

The arrangement of metals in a vertical column in the decreasing order of their reactivities 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 metals 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,

$$H \longrightarrow H^+ + e^-$$

3.1 Which metal can be displaced by copper from its salt solution? [1]

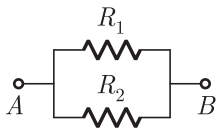
3.2 An element 'X' after reacting with acids liberate hydrogen gas and can displace lead and tin from their salt solution. Write down the Name of X metal. [1]

3.3 Write down the name of most reactive metal [1]

3.4 Which metal does not liberate hydrogen gas after reacting with acid? [1]

Q4. **Question number 4.1-4.4 are based on the two table below study these table related to equivalent resistance and answer the question that follows.**

Table -A Combination of resistance

Combination	Circuit	Equivalent resistance
Parallel		$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$

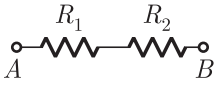
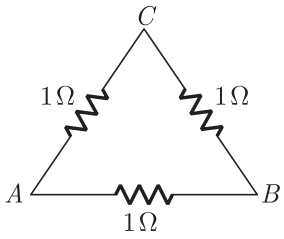
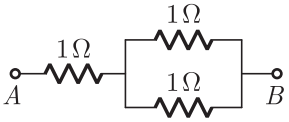
Combination	Circuit	Equivalent resistance
Series		$R_{eq} = R_1 + R_2$

Table -B

Student	Circuit	Equivalent resistance
Student A	 Circuit - 1	1Ω
Student B	 Circuit - 2	1.5Ω

4.1 Which student measured the wrong equivalent resistance in Table-B? [1]

4.2 In which configuration of resistance, the potential difference across each resistance remains same? [1]

4.3 The value of equivalent resistance of circuit-1 is? [1]

(a) 1Ω (b) 2Ω

(c) 0.4Ω (d) 0.6Ω

4.4 In which configuration of resistance the current across each resistances remain same? [1]

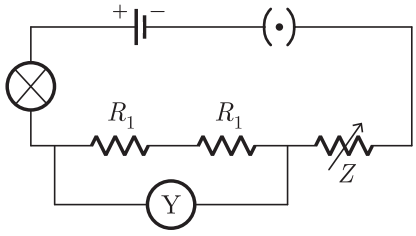
(a) Series combination

(b) Parallel combination

(c) Mixed combination

(d) None of these

Q5. The given circuit diagram shows the experiment arrangement of different circuit components for determination of equivalent resistance of two resistors connected in series. The components X, Y and Z shown in the circuit respectively represent. [1]



(a) Rheostat, Resistor Ammeter

(b) Voltmeter, Ammeter, Rheostat

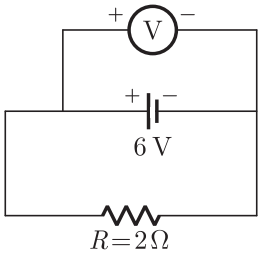
(c) Ammeter Voltmeter, Rheostat

(d) Rheostat, Ammeter, Voltmeter

OR

When a student connects a voltmeter across the terminals of a battery, it measures 6 V. If he connects a resistance of 2Ω across the terminals of the battery as shown in the figure, then the

current flowing through this resistance (R) must be



(a) 2 A (b) 3 A
(c) 4 A (d) 6 A

Q6. A student was asked to obtain real image of a tree on the screen with the help of suitable mirror. He can do by taking a : [1]
(a) concave mirror
(b) plane mirror
(c) convex mirror
(d) both either concave or by convex mirror

Q7. A student wants to draw diagram for formation of a real image at 2F of a convex lens. For this he must take the object placed at [1]
(a) infinity
(b) focus
(c) between optical centre and focus
(d) 2 F

Q8. In the experimental set-up to show that CO_2 is given out during respiration, the level of water in the delivery tube (the end that is immersed in water of the beaker) shows a: [1]
(a) gradual fall (b) rapid fall
(c) rise and fall alternately (d) rise

OR

In binary fission, the parent cell divides by the process
(a) the cytoplasm and nucleus divide at same time
(b) the nucleus first divides then cytoplasm
(c) the cytoplasm first divides then nucleus
(d) the cytoplasm and nucleus do not divide

Q9. $Fe_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Fe$
The above reaction is an example of a : [1]
(a) combination reaction
(b) double displacement reaction
(c) decomposition reaction
(d) displacement reaction

Q10. The colours obtained on a pH paper for a highly acidic, basic and neutral solutions are [1]
(a) blue, orange, green (b) yellow, blue, green
(c) red, blue, green (d) red, green, blue

Q11. When a student boiled the given sample of water containing temporary hardness, he observed that it now gave good amount of lather because by boiling : [1]

(a) the bicarbonate of sodium decomposes

(b) the bicarbonate of magnesium decomposes

(c) the bicarbonate of Zn decomposes

(d) the bicarbonate of Al decomposes

Q12. Which of the following is not a property of carbon? [1]

(a) Carbon compounds are good conductor of heat and electricity

(b) Carbon compounds are poor conductor of heat and electricity

(c) Most of the carbon compounds are covalent compounds

(d) Boiling and melting point of carbon compounds are relatively lower than those of ionic compounds

OR

Which of the following is not the use of graphite?

(a) It is used as lubricant

(b) It is used in manufacturing of lead-pencils

(c) It is used in manufacturing of artificial diamond

(d) It is used for making insulated plates

For question numbers 13 and 14, two statements are given-one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

(a) Assertion is true and reason is correct explanation of assertion.

(b) Assertion is true but reason is false.

(c) Assertion is false but reason is true.

(d) Both are true but reason is not correct explanation of assertion.

Q13. **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]

Q14. **Assertion** : Mendeleev did not leave any gap in his periodic table.
Reason : Gaps were necessary for unknown elements. [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. 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:

i. $CaCO_3(s) \xrightarrow{heat} CaO(s) + CO_2(g)$

ii. $CaO(s) + H_2O(l)C \longrightarrow Ca(OH)_2(aq)$

iii. $Zn(s) + H_2SO_4(aq) \longrightarrow ZnSO_4(aq) + H_2(g)$

Q17. (a) Name metals among the first five elements of the Modern Periodic Table.
(b) Write their symbols.
(c) Write the formula of their oxides. [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?

Q19. What is biodegradable substances? Describe two ways in which non-biodegradable substances affect our environment. [3]

Q20. Define 'nerve impulse'. Which structure in a neuron helps to conduct a nerve impulse : [3]
i. towards the cell body ?
ii. away from the cell body?

Q21. How do auxins promote the growth of a tendril around a support? [3]

Q22. (i) What is meant by scattering of light?
(ii) Mention the factor on which it depends. Explain why the colour of the clear sky is blue?
(iii)An Astronaut in space finds sky to be dark. Explain reason for this observation. [3]

Q23. How does a solenoid behave like a magnet ? Can you determine the north and south poles of a current-carrying solenoid with the help of a bar magnet? Explain. [3]

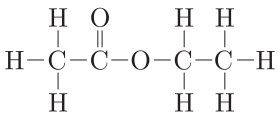
Q24. A 5.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 30 cm. By calculation determine (i) the position and (ii) the size of the image formed. [3]

OR

A real image, $\frac{1}{5}^{th}$ the size of object is formed at a distance of 18 cm from a mirror. What is the nature of mirror? Calculate its focal length.

SECTION C

Q25. 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 acdid 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]

Q26. Give reasons for the following : [5]
i. Zinc oxide is considered as an amphoteric oxide.
ii. Non-metals in general do not displace hydrogen from dilute acids.
iii. Metals conduct electricity.

Q27. Make a comparison between photosynthesis and respiration. [5]

Q28. 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]

OR

What is lymph? Write its important functions.

Q29. i. Define 1 dioptre of power. Find the focal length of a lens of power $-2.0\,\mathrm{D}$. [5]
ii. Why does a lemon kept 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 ?

Medium	*A*	*B*	*C*
Refractive Index	1.33	1.5	2.4

iv. What do you mean by dispersion of light?

Q30. 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.