

CLASS X (2020-21)
SCIENCE (CODE 086)
SAMPLE PAPER-3

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. Which one of these has a higher concentration of H^+ ions ? [1]
1 M HCl or 1 M CH_3COOH

OR

A few drops of sulphuric acid are added to water before electrolysis, why?

Q2. What is an alkali? [1]

Q3. At what pH rain water is said to be acidic ? [1]

Q4. What are the units of power of a lens? [1]

Q5. Which colour of white light suffers (i) least deviation and (ii) maximum deviation when a beam of white light passes through a glass prism? [1]

Q6. State the laws of reflection. [1]

OR

How many images are formed by two parallel mirrors?

Q7. Why are magnetic field lines closed curves? [1]

Q8. How is the induced current in a secondary coil related to current in a primary coil? [1]

Q9. State which has a higher resistance a 50 W or a 25 W lamp bulb and how many times? [1]

OR

Define resistivity of a material.

Q10. Name the type of blood vessels, which carry blood from organs to the heart. [1]

Q11. Which tropic movement is responsible for the growth of pollen tubes towards ovules? [1]

OR

Why endocrine glands release their secretions into the blood?

Q12. How is the age of fossil determined? [1]

OR

What is evolution?

Q13. What is acid rain? [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 :** Plaster of Paris should be stored in moisture proof containers.

Reason : Plaster of Paris on coming in contact of moisture, absorbs water and reacts chemically to form hydrated calcium sulphate, which sets to form a hard mass. [1]

Q15. **Assertion :** Iron is found in the free state in nature.

Reason : Iron a highly reactive element. [1]

OR

Assertion : Different metals have different reactivities with water and dilute acids.

Reason : Reactivity of a metal depends on its position in the reactivity series.

Q16. **Assertion :** Consumers are present at the first trophic level.

Reason : Consumers or heterotrophs fix energy making it available for autotrophs. [1]

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

1 × 4

Chemistry is one of the most sophisticated branches of science, would not have been the same if Russian scientist Dmitri Ivanovich Mendeleev had not come up with the periodic table on March 6, 1869. Until 1863, the world was aware of only 56 known elements. The rate of scientific progress was such that every year, a new element was being discovered. It was during this time periodic table. He published the periodic table in his book- "The Relation between the Properties and Atomic Weights of the Elements". He had found a definitive pattern following which each element could be placed according to their atomic weight. He noticed that elements that are similar in their similar chemical properties either had the atomic weight or had a regular increase. He also predicted the properties of the missing (yet to be discovered) elements and gave them Sanskrit names.

17.1 Which of the following statement about the Mendeleev's periodic table is correct ?

(a) It has 8 vertical columns known as groups.

- (b) It has 18 horizontal rows known as periods.
- (c) It has 7 horizontal rows known as groups
- (d) It has 18 vertical columns known as periods

17.2 According to Mendeleev's periodic law, the elements were arranged in the periodic table in the order of :

- (a) decreasing atomic numbers
- (b) increasing atomic numbers
- (c) decreasing atomic masses
- (d) increasing atomic masses

17.3 In Mendeleev's periodic table, gaps were left for the elements to be discovered later on. An element which found a vacant place in the periodic table later on is :

- (a) Se
- (b) Ge
- (c) Si
- (d) Be

17.4 Gallium was named by Mendeleev as :

- (a) Eka-aluminium
- (b) Eka-silicon
- (c) Eka-germanium
- (d) Eka-zinc

17.5 Which of the following statement is correct in regard to Mendeleev's periodic table ?

- I. Position of isotopes could not be explained.
 - II. It is true for elements upto calcium only.
 - III. It could accommodate noble gases when they were discovered
 - IV. It assigned correct position to hydrogen.
- (a) I and II only
 - (b) I and III only
 - (c) I, II and III
 - (d) IV only

Q18. Answer question numbers 18.1-18.4 on the basis of your understanding of the following paragraph and the related studied concepts.

1 × 4

In the series combination, the resistances are joined end to end. For a series combination of resistors, $R_s = \sum R_i$ and current through each resistor is same but their potential difference between their ends are different according to their resistors. When two or more resistors are combined in such a way that their first ends are connected to one point and the second ends to another point. In a parallel combination of resistors, $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$ and potential drop across each resistor is same but current in different resistances are different.

18.1 If we connect n bulbs each with a rated power P in series, then the total power consumed by combination at rated current is

- (a) Pn
- (b) Pn^2
- (c) P/n
- (d) $P^2 n$

18.2 If we connect n bulbs each with a rated power P in parallel, then the total power consumed by combination at rated voltage is

- (a) Pn
- (b) Pn^2
- (c) P^2/n
- (d) P/n

18.3 The power consumed by n equal resistance in parallel is x times that of power consumed in series, if the voltage supply is same. The value of x is

- (a) n
- (b) n^2
- (c) n^3
- (d) $n^{1/2}$

18.4 If resistors 4Ω , 5Ω and 6Ω are connected in series with 5 V battery, then the total power consumed by the combination is

- (a) $\frac{5}{3}$ W
- (b) $\frac{5}{4}$ W

(c) $\frac{9}{4}W$

(d) $\frac{1}{2}W$

Q19. **Read the following and answer any four question from (19.1) to (19.5) :**

1 × 4

A concave mirror forms image of an object thrice in its size on a screen. Magnification of a mirror gives information about the size of the image relative to the object. It is defined as the ratio of size of image to the size of object. It is represented by m .

$$m = \frac{\text{Size of image}}{\text{Size of object}}$$

Sign of magnification by mirror gives the information about the nature of the image produce by it.

19.1 The nature of formed image is

- (a) Real and inverted (b) Virtual and erect
(c) Virtual, and enlarged (d) None of these

19.2 If the object x distance from the pole of mirror, then image distance from the pole is.

- (a) $-2x$ (b) $-3x$
(c) $-4x$ (d) $-x$

19.3 If the radius of curvature of mirror is R , then the relation between object distance, image distance and focal length of the mirror is.

- (a) $\frac{1}{x} + \frac{1}{2x} = \frac{2}{R}$ (b) $\frac{1}{x} + \frac{1}{3x} = \frac{2}{R}$
(c) $\frac{1}{x} + \frac{1}{3x} = \frac{2}{R^2}$ (d) $\frac{1}{(x)^2} + \frac{1}{(3x)} = \frac{2}{R}$

19.4 When an object is placed at infinity then the nature of image will be.

- (a) real, inverted, highly diminished (b) virtual, inverted, diminished
(c) virtual, inverted, infinitely large (d) real, erect and smaller

19.5 An object is placed at the centre of curvature of a concave mirror. The distance between its image and the pole is

- (a) equal of f (b) between f and $2f$
(c) equal of $2f$ (d) greater than $2f$

Q20. **Different magnetic field patterns are produced by current-carrying conductors having different shapes.**

1 × 4

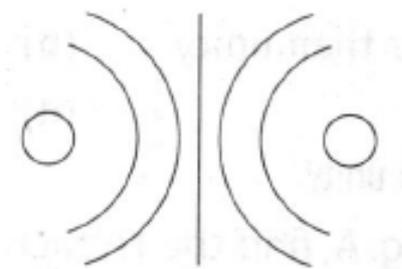
The magnetic field lines around a straight conductor (straight wire) carrying current are concentric circles whose centres lie on the wire. It has been shown by experiments that the magnitude of magnetic field produced by a straight current carrying wire at a given point is : (i) directly proportional to the current passing in the wire, and (ii) inversely proportional to the distance of that point from the wire.

The magnetic field lines are circular near the current carrying circular loop. As we move away, the concentric circles representing magnetic field lines become bigger and bigger and at the centre the magnetic field lines are straight.

20.1 The direction of magnetic field developed around a current-carrying conductor can be easily found by the use of :

- (a) Fleming's left-hand rule (b) Left-hand thumb rule
(c) Right-hand thumb rule (d) Fleming's right hand rule

20.2 The diagram given below represents magnetic field caused by a current-carrying conductor which is :



- (a) a solenoid
(b) a long straight wire
(c) a circular coil
(d) a short straight wire
- 20.3** The strength of magnetic field due to a straight conductor depends on the :
(a) nature of conductor
(b) current passing through the wire
(c) direction of current
(d) all of above
- 20.4** Which of the following correctly describes the magnetic field near a long straight wire?
(a) The field consists of straight lines perpendicular to the wire
(b) The field consists of straight lines parallel to the wire
(c) The field consists of radial lines originating from the wire
(d) The field consists of concentric circles centred on the wire
- 20.5** The strength of magnetic field inside a long current carrying straight solenoid is :
(a) same at all points
(b) minimum in the middle
(c) found to increase from one end to the other
(d) more at the ends than at the centre.

SECTION B

- Q21. What are enzyme? Do they play some role in our digestive system too? [2]

OR

What is the role of large intestine?

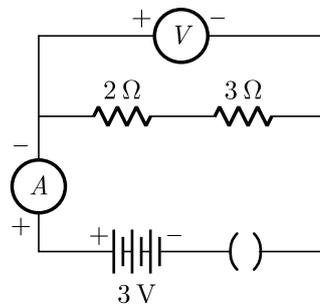
- Q22. What is meant by hydro-tropism? Give an example. [2]

- Q23. Which of the following listed metals can displace zinc from its salt solution? Give reason for your answer with a chemical equation: [2]
Copper, Lead, Magnesium, Silver

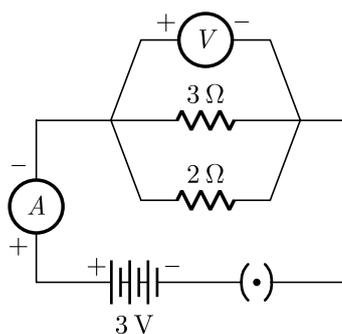
OR

The reaction of metal X with Fe_2O_3 is highly exothermic and is used to join railway tracks. Identify metal X. Write the chemical equation for the reaction.

- Q24. Find the voltmeter readings for the circuits I and II shown. [2]



(I)



(II)

Q25. Give reasons for the following : [2]

- i. Non-metals, in general, do not displace hydrogen from dilute acids.
- ii. Aluminium easily combines with oxygen but still it can be used for making kitchen utensils.

Q26. List in a tabular form two differences between a voltmeter and an ammeter. [2]

SECTION C

Q27. i. Name the plant used by Mendel to carry out his experiments. [3]

ii. Study the following cross and answer the questions that follow :

Parents	Green and Round seed	×	Yellow and Wrinkled seed
	F ₁ Generation		All Green and Round seeds

F ₂ Generation	Green and Round (9)	Green and Wrinkled (3)	
	Yellow and Round (3)	Yellow and Wrinkle	

- (a) List the dominant and recessive characters.
- (b) Are the characters linked or independent?

OR

- i. Differentiate between sensory neurons and motor neurons.
- ii. How is brain protected in our body?
- iii. Name the part of the brain responsible for precision of voluntary actions and maintaining body posture and balance of the body.

Q28. The ozone layer is formed high up in the atmosphere by the action of ultraviolet radiation on

oxygen gas. The damage of the ozone layer leads to variation in rainfall, ecological disturbances and other effects in global food supply. United Nations Environment programme (UNEP) has signed an agreement to limit this damage in 1986.

- i. Where is ozone layer found in the atmosphere?
- ii. How is ozone layer formed in the atmosphere?
- iii. How can you contribute in saving the ozone layer? [3]

Q29. Write equations to show the presence of all ions in the aqueous solutions of : [3]

- i. CH_3COOH
- ii. H_3PO_4
- iii. HI

Q30. Mention the components of the transport system in highly organised plants. State the functions of these components. [3]

Q31. (i) Name all the digestive enzymes present in our digestive system.
(ii) Explain the process of digestion of carbohydrates, fats and proteins. [3]

Q32. Why does the sun appear reddish early in the morning? Will this phenomenon be observed by an observer on the moon? Justify your answer with a reason. [3]

Q33. What is ethanol? Draw the structure of ethanol molecule. How does ethanol behave with the following:

- i. Sodium
- ii. Excess of con. sulphuric acid at 443 K ?

Write chemical equation for each reaction. [3]

SECTION D

Q34. An element X (atomic number 17) reacts with an element Y (atomic number 20) to form a divalent halide.

- i. Where in the periodic table are elements X and Y placed?
- ii. Classify X and Y as metal (s), non-metal(s) or metalloid(s).
- iii. What will be the nature of the oxide of element Y? Identify the nature of bonding in the compound formed.
- iv. Draw the electron dot structure of the divalent halide. [5]

OR

State the reason why?

- i. Carbon is not used to reduce the oxides of sodium or aluminium.
- ii. An iron strip is dipped in a blue copper sulphate solution turns the blue solution pale green.
- iii. Metals replace hydrogen from acids whereas non-metals do not.
- iv. Calcium does not occur free in nature.
- v. Zinc is used in the galvanisation of iron and not the copper.

Q35. i. Draw a diagram depicting the Human Alimentary Canal and label on it, Gall Bladder, Liver and Pancreas.

- ii. State the roles of liver and pancreas.
- iii. Name the organ which performs the following functions in humans :
 - (a) Absorption of digested food.
 - (b) Absorption of water [5]

Q36. "A convex lens can form a magnified erect as well as magnified inverted image of an object placed

in front of it.” Draw ray diagrams to justify this statement stating the position of the object with respect to the lens in each case.

An object of height 4 cm is placed at a distance of 20 cm from a convex lens of focal length 10 cm. Use lens formula to determine the position of the image formed. [5]

OR

- i. What is meant by dispersion of light?
- ii. Describe the formation of rainbow in the sky.
- iii. With the help of a labelled diagram, explain why the sun appears reddish at the sunrise and the sunset.

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