



SPECIAL SAMPLE PAPER 4

Class 10 - Science

Time Allowed: 3 hours

Maximum Marks: 80

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

1. Chemically rust is: [1]
 - a) Metal oxide
 - b) Ferric oxide
 - c) Ferrous oxide
 - d) Hydrated ferric oxide
2. Which among the following statements is incorrect for magnesium metal? [1]
 - a) It burns in oxygen with a dazzling white flame
 - b) It reacts with steam to form magnesium hydroxide and evolves hydrogen gas
 - c) It reacts with cold water to form magnesium oxide and evolves hydrogen gas
 - d) It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas
3. The odour of ethanoic acid resembles which one of the following: [1]
 - a) Kerosene
 - b) Pungent
 - c) Rose
 - d) Vinegar
4. How many pairs of contrasting characters of pea were selected by Mendel for cross-fertilization? [1]
 - a) Five
 - b) Six
 - c) Twelve
 - d) Seven
5. The light from a distant object on passing through the convex lens (f-focal length): [1]

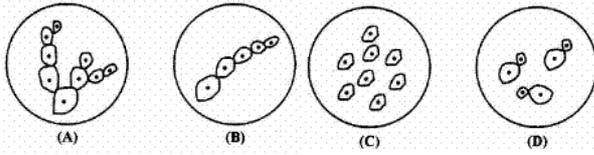
a) converges at $2f$

b) appears to diverge from focus

c) converges at focus (f)

d) appears to diverge from $2f$

6. The following are the sketches made by some students. The sketch not illustrative of budding in yeast is : [1]



a) B

b) D

c) C

d) A

7. In an experiment to trace the path of a ray of light passing through a rectangular glass slab, four students tabulated their observations as given below: [1]

Student →	A	B	C	D
$\angle i$	30°	30°	30°	30°
$\angle r$	18°	20°	17°	21.5°
$\angle e$	32°	32.5°	30°	34.5°

Which student performed the experiment most correctly

a) B

b) C

c) D

d) A

8. Match the following with correct response [1]

Column A	Column B
(i) Insects	(a) Gills
(ii) Earthworm	(b) Trachea
(iii) Fishes	(c) Lungs
(iv) Mammals	(d) Skin

a) (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)

b) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)

c) (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)

d) (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)

9. Match the following with correct response. [1]

Column A	Column B
(i) Thyroid gland	(a) Testosterone
(ii) Pancreas	(b) Thyroxin
(iii) Testis	(c) Estrogen
(iv) Ovaries	(d) Insulin and glucagon

a) (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)

b) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)

c) (i) - (a), (ii) - (d), (iii) - (b), (iv) - (c)

d) (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)

10. Chlamydia is related to: [1]

- a) Urethra
c) Gonorrhoea
- b) Syphilis
d) HIV
11. Name the connective tissue covering of the brain [1]
a) Cerebrospinal fluid
b) Meninges
c) Squamous epithelial
d) Adipose tissue
12. Galvanization is a method of protecting iron from rusting by coating with a thin layer of [1]
a) Silver
b) Gallium
c) Zinc
d) Aluminium
13. The number of chromosomes in parents and offsprings of a particular species remains constant due to [1]
a) doubling of chromosomes after zygote formation
b) doubling of chromosomes after gamete formation
c) halving of chromosomes after gamete formation
d) halving of chromosomes during gamete formation
14. Which of the following represents a saponification reaction? [1]
a) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{H}_2\text{SO}_4} \text{CH}_3\text{COO}_2\text{H}_5$
b) $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{C}_2\text{H}_5\text{OH}$
c) $\text{CH}_3\text{COONa} + \text{NaOH} \xrightarrow{\text{CaO}} \text{CH}_4 + \text{Na}_2\text{CO}_3$
d) $2\text{CH}_3\text{COOH} + 2\text{Na} \rightarrow 2\text{CH}_3\text{COONa} + \text{H}_2$
15. A student prepared 20% sodium hydroxide solution in a beaker to study saponification reaction. Some observation related to this are given below. [1]
i. Sodium hydroxide solution turns red litmus blue.
ii. Sodium hydroxide readily dissolves in water.
iii. The beaker containing solution appears cold when touched from outside.
iv. The blue litmus paper turns red when dipped into the solution.
What are the correct observation?
a) (i) and (ii)
b) (i) and (iii)
c) (ii) and (iii)
d) (i) and (iv)
16. Strong heating of ferrous sulphate leads to the formation of a brown solid and two gases. This reaction can be categorised as: [1]
a) displacement and redox
b) displacement and endothermic
c) decomposition and exothermic
d) decomposition and redox
17. **Assertion (A):** Gas bubbles are observed when sodium carbonate is added to dilute hydrochloride acid. [1]
Reason (R): Carbon dioxide is given off in the reaction.
a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.
18. **Assertion (A):** At high temperatures, metal wires have a greater chance of short-circuiting. [1]

Reason (R): Both resistance and resistivity of a material vary with temperature.

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

19. **Assertion (A):** Carbohydrate digestion mainly takes place in the small intestine. [1]

Reason (R): Pancreatic juice contains the enzyme lactase.

- 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.

20. **Assertion (A):** Bronze is an alloy of lead and tin. [1]

Reason (R): Alloys are a heterogeneous mixture of metals with other metals and non-metals.

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

Section B

21. When do we consider a student sitting in the class to be myopic? List two causes of this defect. Explain using a ray diagram how this defect of eye can be corrected. [2]

OR

State one main function each of iris, pupil, and cornea.

22. What is the dam? Why do we seek to build large dams? While building large dams, which three main problems should particularly be addressed to maintain peace among local people? Mention them. [2]

23. With respect to air the refractive index of ice is 1.31 and that of rock salt is 1.54. Calculate the refractive index of rock salt with respect to ice? [2]

24. Write the function of the following : [2]

- i. Renal artery
ii. Renal vein

25. A road tanker carrying an acid was involved in an accident and its contents spilled on the road. At the side of the road iron drain cover began melting and fizzing as the acid ran over them. A specialist was called to see if the acid actually leaked into the nearby river. [2]

(a) Explain why specialist could carry out sample test to see if the river water contains some acid or not (b) Suggest a better report name for the word 'melting'

(c) Explain why the drain covers began fizzing as the acid ran over them.

26. What are covalent compounds? Why are they different from ionic compounds? List their three characteristics properties. [2]

Section C

27. Hydrogen is not a metal but it has been assigned a place in the reactivity series of metals. Explain. [3]

28. List the differences between Biotic and Abiotic components of ecosystem. [3]

29. "A concave mirror of focal length f can form a magnified, erect as well as an inverted image of an object placed in front of it." Justify this statement stating the position of object with respect to the mirror in each case for obtaining these images. [3]

OR

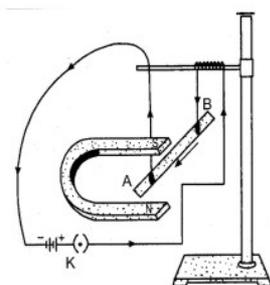
Sudha finds out that the sharp image of window pane of her science laboratory is formed at a distance of 15 cm from the lens. She now tries to focus the building visible of her outside the window instead of the window pane without disturbing the lens. In which direction will she move the screen to obtain a sharp image of the building? What is the approximate focal length of this lens?

30. During respiration in an organism A, one molecule of glucose produces 2 ATP molecules whereas in respiration of another organism B, one molecule of glucose produces 38 ATP molecules. [3]
- Which organism is undergoing aerobic respiration?
 - Which organism is undergoing anaerobic respiration?
 - Which type of organism A or B can convert glucose into alcohol?
 - Name one organism which behaves like A.
 - Name one organism which behaves like B.
31. Why do we observe difference in colours of the Sun during sunrise, sunset and noon? [3]
32. Name one sexually transmitted disease each caused due to bacterial infected and viral infection. How can these prevented? [3]

OR

Mention three important features of fossils which help in the study of evolution.

33. In activity shown, how do you think the displacement of rod AB will be affected [3]



- if the current in rod AB is increased
- a stronger horse shoe magnet is used

Section D

34. What is water of crystallisation? Write the common name and chemical formula of a commercially important compound which has ten water molecules as water of crystallisation. How is this compound obtained? Write the chemical equation also. List any two uses of this compound. [5]

OR

- What happens when a concentrated solution of sodium chloride (brine) is electrolysed? Write the equation of the reaction involved.
 - Why is the electrolysis of a concentrated solution of sodium chloride known as Chlor-alkali process?
 - Name three products of the Chlor-alkali process. State two uses of each of these products.
35. What are reflex actions? Give two examples. Explain a reflex arc. [5]

OR

Draw the structure of a neuron and describe its function.

36. a. Name and state the rule to find the direction of force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it. [5]
- b. Draw a well labelled diagram of an electric motor.

Section E

37. **Read the text carefully and answer the questions:** [4]

Sex determination is the method by which distinction between males & females is established in a species. The sex of an individual is determined by specific chromosomes. These chromosomes are called sex chromosomes or allosomes. X and Y chromosomes are called sex chromosomes. The normal chromosomes other than the sex chromosomes of an individual are known as autosomes.

- (i) In XX-XO type of sex determination who produces two different types of gametes?
- (ii) A couple has six daughters. What is the possibility of their having a girl next time?

OR

What is the number of autosomes present in the liver cells of a human female?

38. **Read the text carefully and answer the questions:** [4]

The heating effect of current is obtained by transformation of electrical energy into heat energy. Just as mechanical energy used to overcome friction is covered into heat, in the same way, electrical energy is converted into heat energy when an electric current flows through a resistance wire. The heat produced in a conductor, when a current flows through it is found to depend directly on (a) strength of current (b) resistance of the conductor (c) time for which the current flows.

The mathematical expression is given by $H = I^2Rt$.

The electrical fuse, electrical heater, electric iron, electric geyser etc. all are based on the heating effect of current.

- (i) What are the properties of heating element?
- (ii) What are the properties of electric fuse?
- (iii) When the current is doubled in a heating device and time is halved, what will be the heat energy produced?

OR

A fuse wire melts at 5 A. It is desired that the fuse wire of same material melt at 10 A. Find the new radius of the wire?

39. **Read the text carefully and answer the questions:** [4]

When oxygen combines with other elements or compounds, the process is called oxidation the substances that combine with oxygen are said to have been oxidized.

The reduction is exactly the opposite of oxidation. If a substance loses oxygen during a reaction, it is said to be reduced. When hydrogen burns the hydrogen combines with oxygen to form water $2H_2 + O_2 = H_2O$

The hydrogen is oxidized in this reaction, but at the same time, the oxygen is reduced. Whatever oxidation occurs reduction must also occur.

- (i) Which chemical process is used for obtaining a metal from its oxide?
- (ii) In the given reaction, which reactant species is oxidized?
- (iii) In the given reaction, which reactant species is reduced?

OR

If four molecules of Hydrogen are combined with oxygen then how many molecules of water are formed?

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