



SCIENCE

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 be 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 be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers 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. The food items like cheese that is shown in the given below image become unfit for eating. This happens due to: [1]

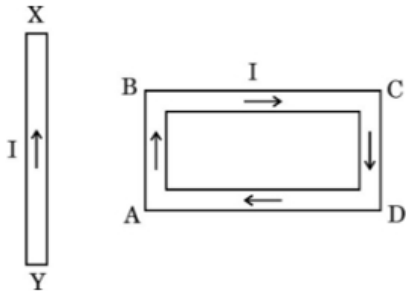


- | | |
|--------------|--------------|
| a) Corrosion | b) Rusting |
| c) Dusting | d) Rancidity |
2. Some crystals of copper sulphate were dissolved in water. The colour of the solution obtained would be: [1]
- | | |
|----------|---------|
| a) Green | b) Red |
| c) Brown | d) Blue |
3. The oxide which can react with HCl as well as KOH to give corresponding salt and water is [1]
- | | |
|----------------------------|--------------------------|
| a) Al_2O_3 | b) Na_2O |
| c) CuO | d) K_2O |
4. The number of shells required to write the electronic configuration of Potassium (At. No. 19) [1]
- | | |
|------|------|
| a) 3 | b) 2 |
|------|------|

- a) 3 : 1
 c) 1 : 3
- b) 1 : 1
 d) 2 : 1

12. Opening and closing of stomata is due to [1]
- a) Movement of water in and out of the guard cells.
 b) Stimulus of light in the guard cells.
 c) Diffusion of CO₂ in and out of the guard cells.
 d) High pressure of gases inside the cells.

13. A rectangular loop ABCD carrying a current I is situated near a straight conductor XY, such that the conductor is parallel to the side AB of the loop and is in the plane of the loop. If a steady current I is established in the conductor as shown, the conductor XY will [1]



- a) move towards the side AB of the loop.
 b) remain stationary.
 c) rotate about its axis.
 d) move away from the side AB of the loop.
14. The heat produced in a wire of resistance x when a current y flows through it in time z is given by: [1]
- a) $y \times z \times x$
 b) $x^2 \times y \times z$
 c) $x \times z \times y^2$
 d) $y \times z^2 \times x$
15. Select the option that contains only biodegradable wastes. [1]
- a) Jute bag, Mouldy bread, Newspaper
 b) Cotton cloth, Mango fruit, Nylon wire
 c) Aluminium can, Keyboard, Plastic bag
 d) Orange peel, Metal key, Roti
16. Which of the following are environment-friendly practices? [1]
- a) Carrying cloth-bag to put purchases in while shopping
 b) Walking to school instead of getting your mother to drop you on her scooter
 c) Switching off unnecessary lights and fans
 d) All of these
17. **Assertion (A):** Paint is applied on the iron articles. [1]
Reason (R): To protect them from rain.
- 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):** Sexual reproduction increases genetic diversities and plays a role in origin of new species. [1]
Reason (R): Sexual reproduction involves the formation of gametes and fusion of gametes.
- 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):** The magnitude of the magnetic field at a point on the axis of a current-carrying solenoid is inversely proportional to the current flowing through the solenoid. [1]
Reason (R): The magnitude of the magnetic field at a point on the axis of a current-carrying solenoid is directly proportional to the number of turns per unit length of a solenoid.
- 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.
20. **Assertion (A):** Abiotic component of an ecosystem involves cycling of material and flow of energy. [1]
Reason (R): This is essential to keep biotic factors alive.
- 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. Draw the structures of the following compounds: [2]
a. Ethanoic acid
b. Bromopentane
c. Butanone
22. List the two types of reproduction. Which one of the two is responsible for bringing in more variations in its progeny and how? [2]
23. Which substances are found in the glomerular filtrate in the kidneys of a mammal? Also name the substance that fails to pass the glomerulus. [2]

OR

What are hypertension and hypotension?

24. What will happen to a ray of light when it falls normally on a surface? Show it diagrammatically. [2]
25. Explain why the uses of plastic bags are banned in many places? What could be more environment friendly alternative? [2]

OR

What is the role of decomposers in the ecosystem?

26. Parthiv with normal near point (25 cm) reads a book with small print using a magnifying glass, a thin convex lens of focal length 5 cm. What are the closest and farthest distances at which he can read the book viewing through the magnifying glass? [2]

Section C

27. There are 3 unknown metals - A, B and C. C displaces B from its oxide while with oxide of A, there is no reaction. Give the reactivity order of A, B and C. [3]
28. A group of a students looked at different metals and metal sulphate solutions given is a tabular form. From the data, answer the following: [3]

Metal	Metal sulphate solution	Colour
Chromium	Chromium sulphate	Green
Cobalt	Cobalt sulphate	Pink

Copper	Copper sulphate	Blue
Magnesium	Magnesium sulphate	Colourless

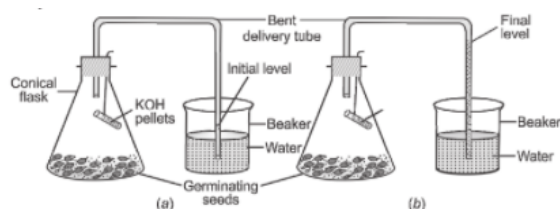
- Which metal reacts with all other sulphate solutions?
- Which metal did not react with any other metal sulphate solution?
- Arrange the metals in decreasing order of reactivity.

OR

Draw the electron-dot structures of the following compounds and state the type of bonding in each case:

- KCl
- NH₃
- CaO
- N₂
- CaCl₂

29. Study the fig (a) and (b). What difference you observe in the figure (b)? Give a justified reason for your answer. [3]



30. A man with blood group A married a person with blood group O. Their daughter has blood group O. Is this information enough to tell you which of the blood group trait A or O is dominant. Why or why not? [3]
31. 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? [3]
32. Derive the relation between kilowatt hour and joule. [3]
33. i. Several electric bulbs designed to be used on a 220V electric supply line are rated 10W. How many lamps can be connected in parallel with each other across the two wires of 220V line if the maximum allowable current is 5A? [3]
 ii. Calculate the cost of seeing 2 movies on colour T.V. daily for the month of September.
 Given wattage of colour T.V. = 60 W, duration of each movie is 2 hours 30 min and 1kWh costs Rs. 4

Section D

34. The solid element A exhibits the property of catenation. It is also present in the form of a gas B in the air which is utilized by plants in photosynthesis. An allotrope C of this element is used in glass cutters. [5]
- What is element A?
 - What is the gas B?
 - Name the allotrope C.
 - State another use of allotrope C (other than in glass cutters).
 - Name another allotrope of element A which exists as spherical molecules.
 - Name a yet another allotrope of element A which conducts electricity.

OR

- State the litmus test to distinguish between an alcohol and a carboxylic acid.

- ii. Give the equation for the reaction of a carboxylic acid with an alcohol. State the condition for the reaction and name the product formed. What is this reaction known as?
- iii. Write a reaction which is reverse of this reaction? Mention the conditions required for the reaction. Name and write the use of this reaction.
35. i. Draw a diagram showing spore formation in Rhizopus and label the (a) reproductive and (b) non-reproductive parts. Why does Rhizopus not multiply on a dry slice of bread? [5]
- ii. Name and explain the process by which reproduction takes place in Hydra.

OR

Some situations in our day to day life require quick response from our body. Illustrate the sentence with the help of suitable diagram and common examples.

36. i. Draw a ray diagram to show the formation of image by a convex lens when an object is placed in front of the lens between its optical centre and principal focus. [5]
- ii. In the above ray diagram mark the object distance (u) and the image distance (v) with their proper signs (+ve or -ve as per the new cartesian sign convention) and state how these distances are related to the focal length (f) of the convex lens in this case.
- iii. Find the power of convex lens which forms a real and inverted image of magnification -1 of an object placed at a distance of 20 cm from its optical centre.

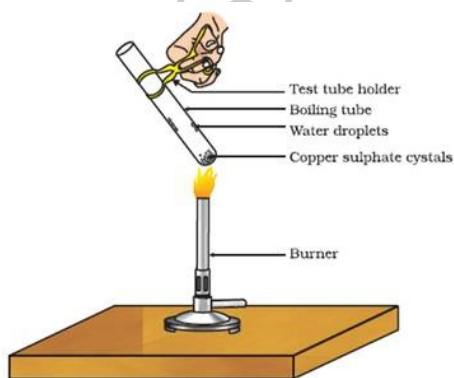
OR

- i. State laws of reflection of light.
- ii. An object of height 5.0 cm is placed at 15 cm in front of a concave mirror of focal length 10 cm. At what distance from the mirror should a screen be placed, so that a focussed image is obtained on it? Find the height of the image.

Section E

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

Copper sulphate crystal contains water of crystallisation when the crystal is heated the water is removed and salt turns white. The crystal can be moistened again with water. The water of crystallisation is the fixed number of water molecules present in 1 formula unit of copper sulphate. On heating gypsum at 373K, it loses water molecules and became calcium sulphate hemihydrate.



- i. If the crystal is moistened with water, then which colour of the crystal reappears?
- ii. What is the commercial name of calcium sulphate hemihydrate?
- iii. How many water molecules are present in one formula unit of copper sulphate?

OR

What is obtained when gypsum is heated at 373K?

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

Animals have a nervous system for controlling and coordinating the activities of the body. But plants have neither a nervous system nor muscles. So, how do they respond to stimuli? When we touch the leaves of a chui-mui (the 'sensitive' or 'touch-me-not' plant of the Mimosa family), they begin to fold up and droop. When a seed germinates, the root goes down, the stem comes up into the air. What happens? Firstly, the leaves of the sensitive plant move very quickly in response to touch.

There is no growth involved in this movement. On the other hand, the directional movement of a seedling is caused by growth. If it is prevented from growing, it will not show any movement.



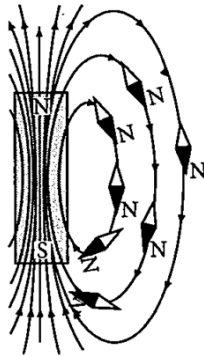
- i. Write the types of movement. (1)
- ii. Give an example of a plant hormone that promotes growth. (1)
- iii. What is the function of the nervous system? (2)

OR

How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light? (2)

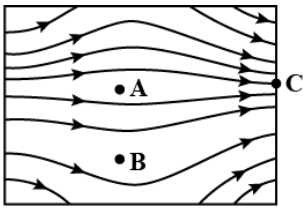
39. **Read the following text carefully and answer the questions that follow:** [4]

A magnetic field is described by drawing the magnetic field lines. When a small north magnetic pole is placed in the magnetic field created by a magnet, it will experience a force. And if the north pole is free, it will move under the influence of the magnetic field. The path traced by a north magnetic pole free to move under the influence of a magnetic field is called a magnetic field line.



Since the direction of the magnetic field line is the direction of the force on a north pole, so the magnetic field lines always begin from the N-pole of a magnet and end on the S-pole of the magnet. Inside the magnet, however, the direction of magnetic field lines is from the S-pole of the magnet to the N-pole of the magnet. Thus, the magnetic field lines are closed curves. When a small compass is moved along a magnetic field line, the compass needle always sets itself along the line tangential to it. So, a line drawn from the south pole of the compass needle to its north pole indicates the direction of the magnetic field at that point.

- i. The figure shows the magnetic field lines in a magnetic field. A, B., and C are three points in this field. At what point is the magnetic field strength? (1)



ii. Do the magnetic field lines intersect? if not why? (1)

iii. A strong bar magnet is placed vertically above a horizontal wooden board. What would be the magnetic lines of force? (2)

OR

Draw the pattern of magnetic field lines for a bar magnet. (2)

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