

Std.: 10th CBSE
Sub: Science

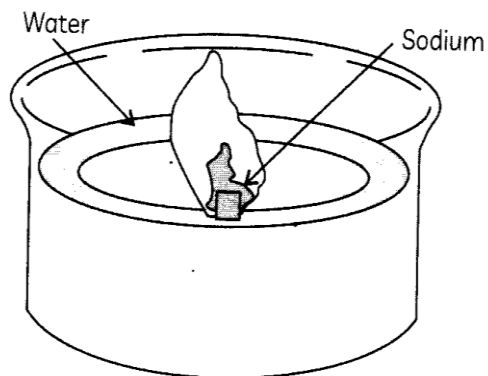
Marks : 80
Time : 3 Hr.
Date : 28/12/2022

Pre-board Set-I

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. 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

- 1.** Akash's chemistry teacher advised him not to throw small pieces of sodium into a sink in the laboratory during experiment. His teacher told him that this can be dangerous as a chemical reaction may occur in the sink. The reaction between sodium and water can occur as shown :

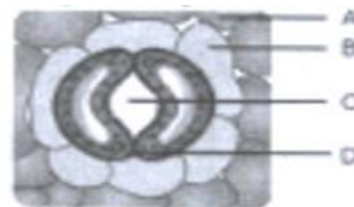


Which of the following statement is true regarding the chemical reaction which can occur here?

- (a) Sodium reacts violently with cold water.
- (b) Endothermic reaction occurs between sodium and cold water.
- (c) Carbon dioxide is released in the sink.
- (d) All of these.

1

- 2.** Given below is the picture of tiny pores present on the green parts of the plants that help in gaseous exchange. Identify A, B, C and D in the given diagram:



- (a) A - Subsidiary cell, B - Epidermal cell, C - Stomatal pore, D - Guard cell
- (b) A - Epidermal cell, B - Subsidiary cell, C - Stomatal pore, D - Guard cell
- (c) A - Guard cell, B - Subsidiary cell, C - Stomatal pore, D - Epidermal cell
- (d) A - Epidermal cell, B - Guard cell, C - Stomatal pore, D - Subsidiary cell

1

- 3.** Why are ionic compounds hard crystalline solids?

- (a) Due to the strong force of attraction between positive ions.
- (b) Due to the strong force of attraction between negative ions.
- (c) Both (a) and (b)
- (d) Due to the strong force of attraction between molecules.

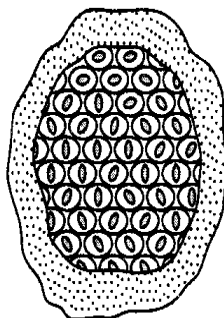
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4. Identify the next homologue of C_2H_4 and C_4H_6 .

	C_2H_4	C_4H_6
(a)	C_3H_5	C_5H_{10}
(b)	C_3H_6	C_5H_8
(c)	C_3H_8	C_5H_{10}
(d)	C_3H_3	C_5H_5

1

5. The following diagram shows the process of reproduction that occur in *Plasmodium*.



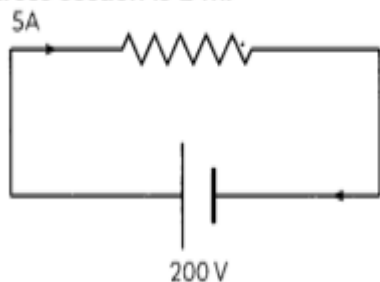
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Identify the type of reproduction:

- (a) Budding (b) Binary fission
(c) Spore formation (d) Multiple fission 1

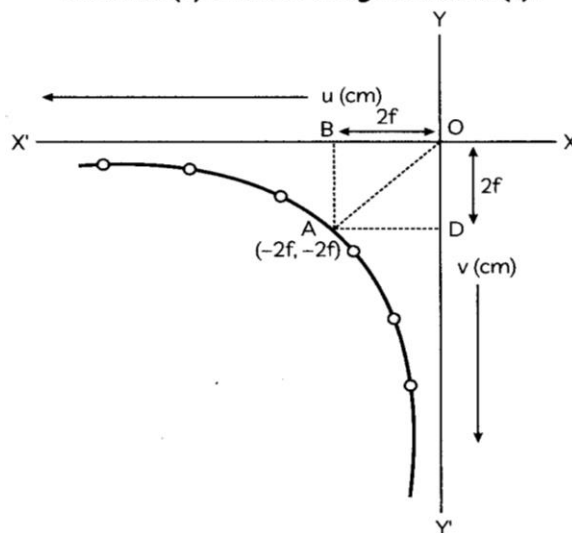
6. A wire has the same resistance as the one given in the figure. Calculate its resistivity if the length of the wire is 10 m and its area of cross section is 2 m.

6



- (a) 16 Ohm-metre
(b) 8 Ohm-metre
(c) 16 kilo Ohm-metre
(d) 8 kilo Ohm-metre 1

7. In order to find out the focal length of a concave mirror, a student plotted the following graph between the object distance (u) and the image distance (v):



Graph between u and v

After analysing the graph a student writes the following statements:

- (I) The image distance decreases as the object is brought closer to the principal focus from infinity.
(II) The image distance increases as the object is brought closer to the principal focus from infinity.

Which of the following would be the correct statement(s)?

- (a) (I) and (III) (b) (I) and (IV)
(c) (II) and (III) (d) (II) and (IV) 1

8. It is necessary to separate oxygenated and deoxygenated blood in mammals and birds because:

- (a) to prevent efficient supply of oxygen
(b) due to their low energy needs
(c) to provide efficient supply of oxygen
(d) to provide efficient supply of carbon dioxide 1

9. How does the refractive index of earth's atmosphere vary with height?

- (a) Hotter air is lighter than the cooler air.
(b) Cooler air is lighter than the hotter air.
(c) Refractive index of both airs is equal.
(d) Refractive index of upper atmosphere is more than colder layers of atmosphere.

1

10. Identify one point of difference between Pepsin and Trypsin.

	Pepsin	Trypsin
(a)	Produced by gastric gland	Produced by small intestine
(b)	Produced by gastric gland	Produced by pancreas
(c)	Acts in acidic medium	Acts in neutral medium
(d)	Acts in basic medium	Acts in acidic medium

1

11. Nitesh met with an accident and lost the capacity to walk in a straight line. Which part of the brain is damaged?

- (a) Fore brain (b) Mid brain
(c) Cerebellum (d) Medulla

1

12. In the following food chain :
frog → grass → insect → snake.
Assign trophic level to frog.

- (a) First (b) Second
(c) Third (d) Fourth

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13. Given below are some ways to reduce the problem of waste disposal.

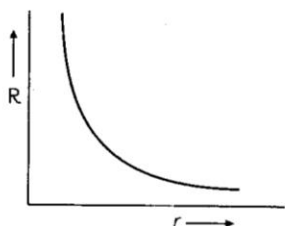
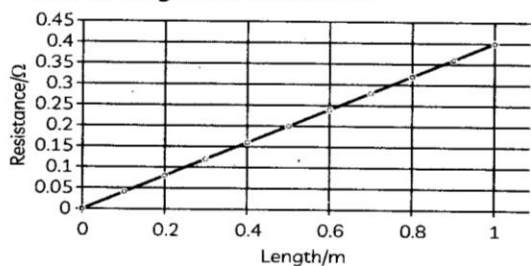
- (I) By mixing of waste before disposing off.
(II) By using more biodegradable waste.
(III) By using more non-biodegradable waste.
(IV) By recycling non-biodegradable waste.

Which of the following are correct?

- (a) (I) and (II) (b) (II) and (III)
(c) (I), (II) and (III) (d) (II) and (IV)

1

14. A student plotted the graphs as shown to study the variation of resistance R of a wire with its length l and radius r .



Select the correct statement (s) after analyzing the graph.

- (I) The resistance of a wire is inversely related to the length of the wire, i.e.

$$R \propto \frac{1}{l}$$

- (II) The resistance of a wire is directly related to the length of the wire, i.e., $R \propto l$.

- (III) The resistance of a wire is inversely related to the radius of the wire, i.e.,

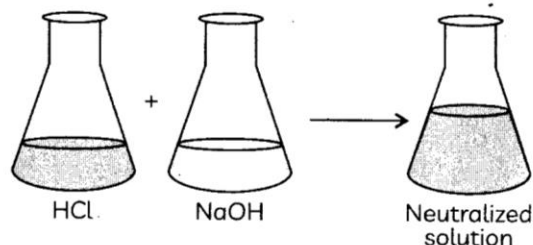
$$R \propto \frac{1}{r}$$

- (IV) The resistance of a wire is inversely related to the square of the radius of the wire, i.e., $R \propto \frac{1}{r^2}$.

- (a) Both (I) and (III) (b) Both (II) and (III)
(c) Both (I) and (IV) (d) Both (II) and (IV)

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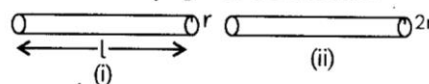
15. Observe the reaction shown here.



If 50 ml of a solution of NaOH is found to be completely neutralized by 40 ml of HCl solution. What will be the amount of HCl solution required to neutralize 100 ml of the same solution of NaOH?

- (a) 160 ml (b) 80 ml
(c) 125 ml (d) 20 ml

16. Two wires of same materials and same resistance are given as shown :



What is the length of wire (ii) :

(a) $\frac{1}{2}$

(b) $2l$

(c) $4l$

(d) $\frac{l}{2}$

1

Q. no 17 to 20 are Assertion - Reasoning based questions.

These consist of two statements - Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

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

17. Assertion (A): Concave mirrors are used as reflectors in torches, vehicle headlights and in search lights.

Reason (R): When an object is placed beyond the centre of curvature of a concave mirror, the image formed is real and inverted. 1

18. Assertion (A): A solenoid tends to expand when a current flows through it.

Reason (R): The cause is an attraction between two metallic

straight wires travelling in the same direction. 1

19. Assertion (A): A moving charge interacts with a magnetic field, but a stationary charge does not.

Reason (R): moving charges generate magnetic fields. 1

20. Assertion (A): Inheritance from the previous generation provides subtle changes in body design for the next generation.

Reason (R): Greater diversity will be generated if asexual reproduction is involved. 1

SECTION - B

12 MARKS

(Q. no. 21 to 26 are very short answer questions.)

21. A white compound on heating decomposes to give brown fumes and a yellow residue is left behind. Write chemical equation of the reaction stating its type. 2

22. Ibrahim applied sodium hydroxide to the lustrous, divalent element M. In the reaction mixture, he saw bubbles beginning to form. When hydrochloric acid was used to treat this element, he recorded the same findings. Tell him how to recognise the gas that was produced. For both reactions, write chemical equations. 2

23. On what factor does the colour of scattered light depend? Explain with an example.

OR

What would happen if danger lights were blue in colour? Justify your answer. 2

24. 'Variations are beneficial to the species but not necessarily for the individual'. Justify.

OR

(A) Identify the organism which causes Kala-azar. How does this organism reproduce?

(B) Draw a diagram showing its reproduction. 2

25. Observe the following cross :

Pure tall pea plant × Pure dwarf pea plant



F₁ Tall plant

What happens to the traits of the dwarf plant? 2

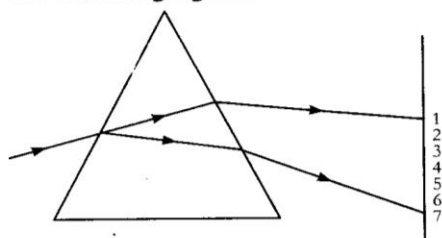
26. Give one example of an organic compound present in biogas. Draw electron dot structure of this compound. 2

SECTION - C

21 MARKS

(Q.no. 27 to 33 are short answer questions.)

27. Rakesh performed the experiment to study the dispersion of light by a glass prism and drew the following figure.



(A) The colour at position marked 3 and 5 are similar to the colour of the sky and

the colour of gold metal respectively. Is the above statement made by the student correct or incorrect? Justify.

(B) Which of the above shown positions correspond approximately to the colour of:

(i) a solution of potassium permanganate?

(ii) danger or stop signal lights?

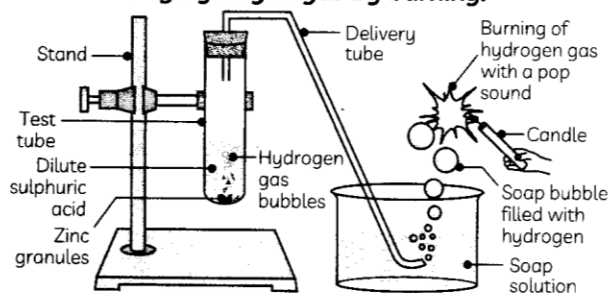
OR

Refractive indices of media A, B, C and D are given:

Media	A	B	C	D
Refractive Index	1.33	1.44	1.52	1.65

In which of these four media is the speed of light (i) Minimum and (ii) Maximum? Give reasons. Find the refractive index of medium A with respect to medium B. 3

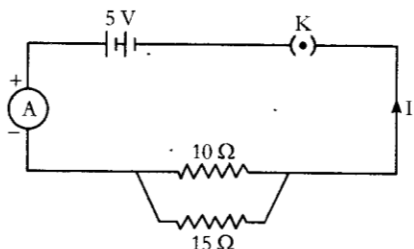
28. A student named Rakhi was performing an experiment in chemistry lab. The following diagram shows the reaction of zinc granules with dilute sulphuric acid and testing hydrogen gas by burning.



What would happen if following changes are made:

- (A) In place of zinc granules, a big piece of zinc is taken.
 (B) In place of zinc granules, copper pieces are taken.
 (C) Instead of dilute sulphuric acid, nitric acid is taken. 3
29. Identify the type of chemical reaction in the following statements and define each of them:
 (A) Digestion of food in our body
 (B) Rusting of iron
 (C) Heating of manganese dioxide with aluminium powder 3

30. Study the following circuit and answer the questions that follows:



SECTION - D

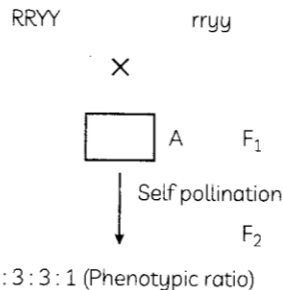
15 MARKS

(Q.no. 34 to 36 are long answer questions.)

34. (A) Different hormones and secreted by different glands. Which hormones are secreted by thyroid, parathyroid and pancreas? Also mention functions of each hormone.
 (B) Write the functions of a part of the hind brain - cerebellum. 5

- (A) State the type of combination of two resistors in the circuit.
 (B) How much current is flowing through (i) 10 Ohms and (ii) 15 Ohms resistor?
 (C) What is the ammeter reading? 3

31. From the dihybrid cross shown below answer the following questions:



- (A) Write the type of seeds produced in F₁ generation.
 (B) Write the type of seeds that were 9 : 3 : 3 : 1 in ratio respectively.
 (C) Show the cross obtained after self pollination of F₁ progeny. 3

32. (A) To discard the household waste, we should have two separate dustbins, one for the biodegradable waste and the other for non-biodegradable waste. Justify the given statement and suggest the proper ways of disposal of such wastes.
 (B) Classify the given waste into biodegradable and non-biodegradable wastes: used tea leaves, leather bag, plastic bag, jute bag. 3

33. (A) What are the functions of kidneys?
 (B) Name the filtration units present in kidneys.
 (C) Name two substances which are selectively reabsorbed from nephric filtrate into the blood. 3

35. Draw the pattern of magnetic field lines around a current carrying solenoid and mark the North and South poles.

What can you say about the magnetic field inside the solenoid? How can a solenoid be used to form an electromagnet?

OR

- (A) Describe the variables that affect the conductor's experience of force.
- (B) When does this force's magnitude reach its peak?
- (C) Identify the rule that aids in determining the conductor's motion's direction.
- (D) If this force initially operated from right to left, how will the force's direction change if:
- the magnetic field's direction is reversed?
 - the current's direction is reversed?

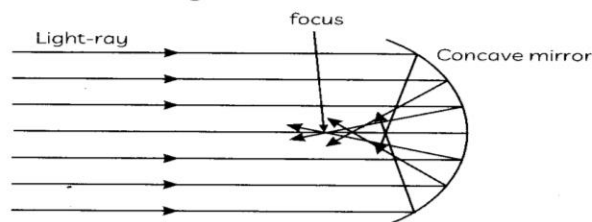
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SECTION - E

12 MARKS

(Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.)

- 37.** A spherical mirror is a mirror which has the shape of a piece cut out of a spherical surface. There are two types of spherical mirrors: concave, and convex. As is well-known, these types of mirrors magnify objects placed close to them. It has been observed that as rays from a distant object depart further from the principal axis of a concave mirror they are brought to a focus ever closer to the mirror, as shown in fig. below:



This lack of perfect focusing of a spherical mirror is called spherical aberration. 5

- (A) Where is the principal focus of a parabolic mirror?
- (B) After reflection from a concave mirror, rays of light parallel to the principal axis converge at a point. What do we call that point?

OR

- (B) Define center of curvature and focal length of a mirror.

- 39.** Have you ever wondered how water reaches the top of tall trees, or for that matter how and why substances move from one cell to the other? Plants need to move molecules over very long distances, much more than animals do; they also do not have a circulatory system in place. Water taken up by the roots has to reach all parts of the plant, up to the very tip of the growing stem. The photosynthates or food synthesised by the leaves have also to be moved to all parts including the root tips embedded deep inside the soil. Movement across short distances, say within the cell, across the membranes and from cell to cell within the tissue has also to take place.

Over small distances substances move by diffusion and by cytoplasmic streaming supplemented by active transport. Transport over longer distances proceeds through the vascular system (the xylem and the phloem) and is called translocation.

The table below gives the results of an experiment carried out to study the factors affecting the rate of transpiration :

- 36.** Sahil bought a compound 'X' on electrolysis in aqueous solution produces a strong base 'Y' along with two gases 'A' and 'B'. 'B' is used in manufacture of bleaching powder. Identify X, Y, A and B. Write chemical equations.

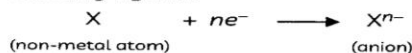
OR

Raman took a sodium compound 'X', which is also used in soda-acid fire extinguisher, and heated it gives a sodium compound 'Y' along with water and carbon dioxide. 'Y' on crystallisation forms a compound 'Z'.

- (A) Identify 'X', 'Y' and 'Z'. Write chemical equations of the reactions taking place.
- (B) How can we obtain Y from Z? Write equation.
- (C) Write any two uses of the compound 'Z'.

5

- 38.** The nature of non-metals is strongly electronegative. To obtain the nearest noble gas configuration, they frequently add electrons to their valence shell. They become anions as a result, which makes them effective oxidising agents.



They react with air or oxygen on heating to form oxides which react with water to form acids. Thus, non-metal oxides are acidic in nature. Non-metals do not react with dilute acids at all. This is because they are electronegative and therefore, cannot displace hydrogen from acids but they form covalent hydrides when heated with hydrogen. 5

- (A) Name the acid formed when sulphur trioxide reacts with water.
- (B) An element 'X' forms an oxide XO_2 , which is a very useful gas used in the process of photosynthesis. Identify the element 'X'.
- (C) Non-metals generally act as oxidising agents. Justify. Identify an element which produces basic oxide on reacting with oxygen?

OR

- (C) Name three elements which form covalent hydride?

Amount of water transpired in 1 Hour (ml)				
	Normal	With Fan	With Heater	With Lamp
Arrowhead	3.6	7.5	6.6	4
Coleus	0.9	6	3.9	3
Devil's Ivy	2.9	4.6	4.1	3
Dieffenbachia	4.1	7.7	6	3.9
English Ivy	1.8	5.1	3.2	2.1
Geranium	1.2	4.7	5.8	2.4
Rubber Plant	4.9	8.4	6.8	4.3
Weeping Fig	3.3	6.1	4.9	2.5
Zebra Plant	4.2	7.6	6.1	3.2

5

- (A) What do we call the absorption and upward movement of minerals from roots to leaves.
- (B) Root pressure is involved in transpiration. Is this statement true?
- (C) Effect of root pressure in transport of water is more important at night. Justify.

OR

- (C) What is the function of phloem?