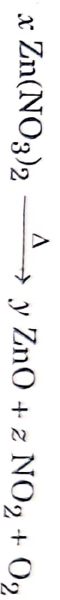


2. The *incorrect* statement about placenta is :
- (A) It is a disc embedded in the uterine wall.
 - (B) It contains villi on the embryo's side of the tissue.
 - (C) It has a very small surface area for glucose and oxygen to pass from mother to the embryo.
 - (D) The embryo gets nutrition from the mother's blood through it.
3. An aqueous solution 'A' turns phenolphthalein solution pink. When another aqueous solution 'B' is added to the pink solution, the pink colour disappears. Now when a few drops of solution 'A' are added to this reaction, the mixture appears pink again. The respective changes in the nature of the solution are from :
- (A) acidic → basic → basic
 - (B) basic → acidic → acidic
 - (C) acidic → basic → acidic
 - (D) basic → acidic → basic
4. The correct sequence of events when someone's hand touches a hot object unconsciously :
- (A) Receptors in skin → Motor neuron → Relay neuron → Sensory neuron → Effector muscle in arm
 - (B) Receptors in skin → Relay neuron → Sensory neuron → Motor neuron → Effector muscle in arm
 - (C) Receptors in skin → Sensory neuron → Relay neuron → Motor neuron → Effector muscle in arm
 - (D) Receptors in skin → Sensory neuron → Effector muscle in arm → Motor neuron → Relay neuron

5. To balance the following chemical equation, the values of the coefficients x , y and z must be respectively :



- (A) 4, 2, 2
(B) 4, 4, 2
(C) 2, 2, 4
(D) 2, 4, 2

6. Which of the following is a redox reaction, but *not* a combination reaction ?

- (A) $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
(B) $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$
(C) $2 \text{Mg} + \text{O}_2 \rightarrow 2 \text{MgO}$
(D) $\text{Fe}_2\text{O}_3 + 3 \text{CO} \rightarrow 2 \text{Fe} + 3 \text{CO}_2$

7. An aqueous solution of sodium chloride is prepared in distilled water. The pH of this solution is :

- (A) 6
(B) 8
(C) 7
(D) 3

8. A metal 'X' is used in the thermite process. When 'X' is heated with oxygen, it gives an oxide 'Y', which is amphoteric in nature. 'X' and 'Y' respectively are :

- (A) Mn, MnO_2
(B) Al, Al_2O_3
(C) Fe, Fe_2O_3
(D) Mg, MgO

9. The process in which transport of soluble products of photosynthesis takes place in plants is known as :

- (A) Transpiration
(B) Evaporation
(C) Conduction
(D) Translocation

10. Sense organ in which olfactory receptors are present is :

- (A) Nose
(B) Skin
(C) Tongue
(D) Inner ear

15. The colour of light for which the refractive index of glass is minimum, is :
- | | |
|-----------|------------|
| (A) Red | (B) Yellow |
| (C) Green | (D) Violet |

16. The current carrying device which produces a magnetic field similar to that of a bar magnet is :
- | | |
|--------------------------|---------------------|
| (A) A straight conductor | (B) A circular loop |
| (C) A solenoid | (D) A circular coil |

For Questions number 17 to 20, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is *not* the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.
17. Assertion (A) : Electrons move from lower potential to higher potential in a conductor.
Reason (R) : A dry cell maintains electric potential difference across the ends of a conductor.
18. Assertion (A) : Some vegetable oils are healthy.
Reason (R) : Vegetable oils generally have long unsaturated carbon chains.
19. Assertion (A) : Sex of the children will be determined by what they inherit from their mother.
Reason (R) : Women have XX sex chromosomes.
20. Assertion (A) : Green plants trap only 1% of the energy of sunlight that falls on their leaves.
Reason (R) : All green plants are the producers in a food chain.

SECTION B

Questions no. 21 to 26 are very short answer type questions.

21. (a) Sometimes while running, the athletes suffer from muscle cramps. Why ? How is the respiration in this case different from aerobic respiration ? 2

OR

- (b) Write the other name given to lymph. State its two functions. 2

22. Write the formula and the molecular mass of the third homologue of alcohols. State how the boiling point of an alcohol changes as one moves from lower to higher homologues. 2

23. (a) Copper powder is taken in a china dish and heated over a burner. Name the product formed and state its colour. Write the chemical equation for the reaction involved. 2

OR

- (b) Write chemical equation for the chemical reaction which occurs when the aqueous solutions of barium chloride and sodium sulphate react together. Write the symbols of the ions present in the compound precipitated in the reaction. 2

24. Identify the organ in the human female reproductive system where the sperm encounters the egg cell. What will happen if it is blocked ? Name the technique by which it can be blocked. 2

25. "The linear magnification produced by a spherical mirror is +3." Based on this statement answer the following questions : 2
- (a) What is the type of mirror ?
- (b) Where is the object located ?
- (c) List two properties of the image formed (other than the size/magnification).

26. The filament of an electric lamp draws a current of 0.5 A, which lights for 2 hours. Calculate the charge that flows through the circuit. 2

15-31/5/3

13

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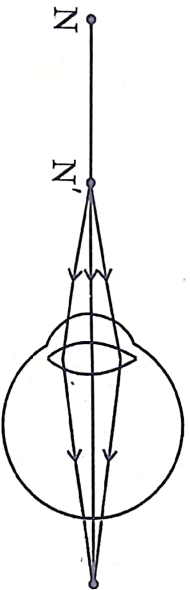
SECTION C

Questions no. 27 to 33 are short answer type questions.

27. Answer the following questions in the context of electrolysis of water : 3
- (a) Why is this reaction/process called a decomposition reaction ?
 - (b) Giving reason state whether this reaction is exothermic or endothermic.
 - (c) Name the gases collected at the anode and cathode.
 - (d) What is the mass ratio of the gases collected at the anode and cathode ?
28. Differentiate between food chain and food web. In a food chain consisting of deer, grass and tiger, if the population of deer decreases, what will happen to the population of organisms belonging to the first and third trophic levels ? 3
29. Name a plant growth hormone synthesized at the shoot tip. Explain its effect on the growth of a plant in response to light. 3
30. Name the ore of mercury and state the form in which it is found in nature. Write the chemical equations along with the condition required for the reactions involved in the extraction of mercury from its ore. 3
31. Mendel crossed pure tall pea plants (TT) with pure short pea plants (tt) and obtained F_1 progeny. When the plants of F_1 progeny were self-pollinated, plants of F_2 progeny were obtained.
- (a) What did the plants of F_1 progeny look like ? Give their gene combination.
 - (b) Why could the gene for shortness not be expressed in plants of F_1 progeny ?
 - (c) Write the ratio of the plants obtained in F_2 progeny and state the conclusion that can be drawn from this experiment. 3

32. A 2000 W heater has a resistance of about 25Ω , whereas a 100 W bulb has a resistance of 500Ω . When 220 V is applied on these, then which of the two
- (a) can carry large currents ?
 - (b) may be used with an electrical circuit having 1.0 A rating ?
 - (c) will be fitted with a 15 A electric board and not with a 5 A electric board ?
- Justify your answer in each case. 3

33. (a) Study the diagram given below and answer the questions that follow :



- (i) Name the defect of vision depicted in this diagram stating the part of the eye responsible for this condition. 3
- (ii) List two causes of this defect.
- (iii) Name the type of lens used to correct this defect and state its role in this case. 3

OR

- (b) What is dispersion of white light ? State its cause. Draw a diagram to show dispersion of a beam of white light by a glass prism. 3

SECTION D

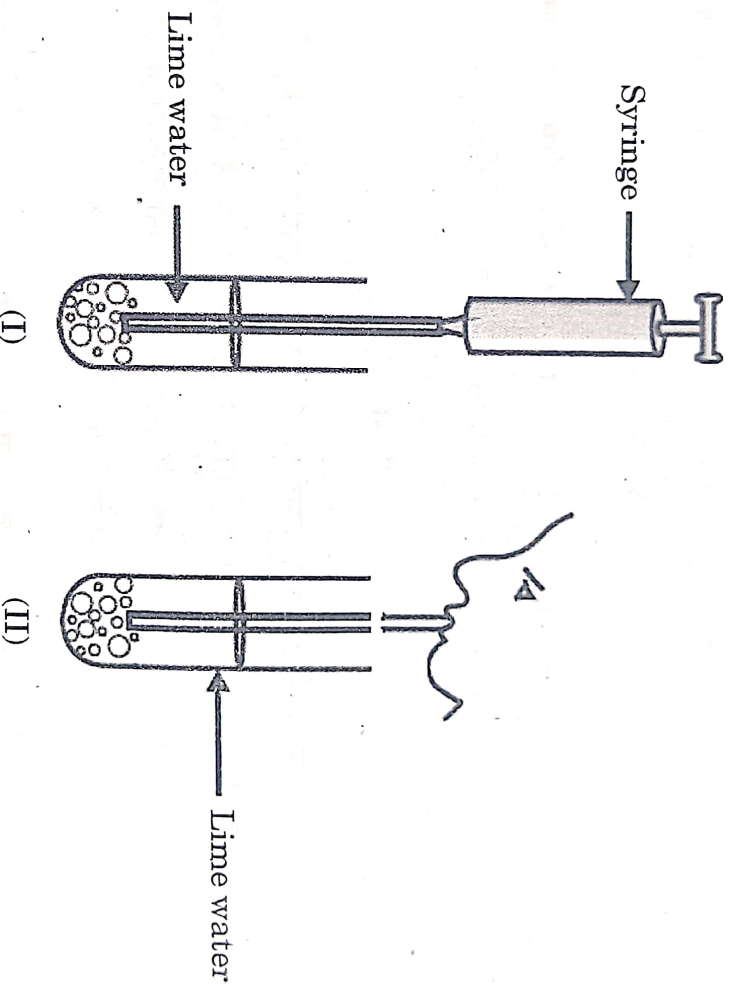
Questions no. 34 to 36 are long answer type questions.

34. (a) Design an experiment to demonstrate that carbon dioxide is essential for photosynthesis. Write the observation and conclusion of the experiment.

5

OR

- (b) (i)



In the experimental set-up shown above in diagram (I) atmospheric air is being passed into lime water with a syringe while in diagram (II) air is being exhaled into lime water. The time taken for the lime water to turn milky in both the test tubes is different. Give reason.

- (ii) Draw the diagram of an open stomatal pore and label (I) Guard cells, and (II) Chloroplast on it. Mention two functions performed by stomata.

5

35.

- (a) A few crystals of ferrous sulphate were taken in a dry boiling tube and heated. Tiny water droplets were observed in the tube after some time.
- From where did these water droplets appear ? Explain.
 - What colour change will be observed during heating ?
 - How many molecules of water are attached per molecule of FeSO_4 crystal ? Write the molecular formula of crystalline forms of (I) Copper sulphate, and (II) Sodium carbonate.
 - State how is Plaster of Paris obtained from gypsum. Write two uses of Plaster of Paris.

5

OR

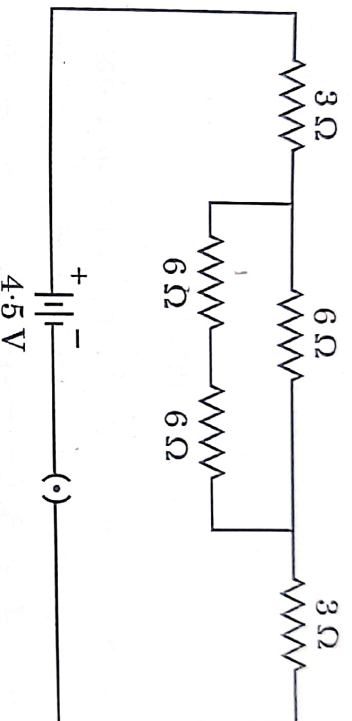
- (b) An acid 'X' present in tamarind when mixed with 'Y', produces a mixture 'Z'. 'Z' on addition to a dough when heated makes cakes soft and spongy. 'Y' is prepared from common salt and helps in faster cooking.
- Write the common names of 'X', 'Y' and 'Z', and the chemical formula of 'Y'.
 - How is 'Y' prepared and how does it help in making cakes soft and spongy ? Illustrate the reaction with suitable chemical equation.
 - Write the name and chemical formula of a mild base other than 'Y' used as an antacid.

5

36. (a) (i) Which type of circuits — series or parallel, should be used when you have to operate different electrical gadgets in your house ? List two reasons for your answer.

- (ii) Find the current flowing through the following electric circuit :

5



OR

- (b) The values of current I flowing in a given resistor for the corresponding values of potential difference V across the resistor are given in the following table :

I (Amperes)	0.5	1.0	2.0	3.0	3.5
V (Volts)	1.5	3.0	6.2	9.3	10.8

- (i) Plot a graph between V and I .
- (ii) Calculate the resistance of the resistor with the help of the graph.
- (iii) What does the graph represent ?
- (iv) Why should this graph pass through the origin ?

5

SECTION E

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

37. A highly polished surface such as a mirror reflects most of the light falling on it. In our daily life we use two types of mirrors — plane and spherical. The reflecting surface of a spherical mirrors may be curved inwards or outwards. In concave mirrors, reflection takes place from the inner surface, while in convex mirrors reflection takes place from the outer surface.

(a) Define the principal axis of a concave mirror.

1

(b) A ray of light is incident on a concave mirror, parallel to its principal axis. If this ray after reflection from the mirror passes through the principal axis from a point at a distance of 10 cm from the pole of the mirror, find the radius of curvature of the mirror.

1

(c) (i) An object is placed at a distance of 10 cm from the pole of a convex mirror of focal length 15 cm. Find the position of the image.

2

OR

(c) (ii) A mirror forms a virtual, erect and diminished image of an object. Identify the type of this mirror. Draw a ray diagram to show the image formation in this case.

2

38. Carbon is a versatile element that forms the basis of all living organisms and many of the things we use. A large variety of compounds is formed because of its tetravalency. Compounds of carbon are formed with oxygen, hydrogen, nitrogen, sulphur, chlorine and many other elements.

Answer the following questions :

(a) What are hydrocarbons ?

1

15-31/5/3

25

P.T.O.

(b) List two properties by virtue of which carbon can form a large number of compounds. 1

(c) (i) Write the formula of the functional group present in (1) aldehydes, and (2) ketones. Write chemical equation for the reaction that occurs between ethanoic acid and ethanol in the presence of a catalyst. 2

OR

(c) (ii) What are structural isomers ? Write the structures of two isomers of butane (C_4H_{10}). 2

39. Pollination is an important process in sexual reproduction of plants. It is an essential process that facilitates fertilisation in plants. Pollinating agents can be wind, water, insects and birds. Several changes take place in the flower after the fertilization has taken place.

(a) Write the main difference between self-pollination and cross-pollination. 1

(b) Name the part of the flower which attracts insects for pollination. What happens to this part after fertilisation ? 1

(c) (i) Define fertilisation. What is the fate of ovules and the ovary in a flower after fertilisation ? 2

OR

(c) (ii) In a germinating seed, which parts are known as future shoot and future root ? Mention the function of cotyledon. 2