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X-A

TAGORE INTERNATIONAL SCHOOL
VASANT VIHAR, NEW DELHI
PRE-BOARD EXAMINATION (2023 -2024)
SCIENCE
CLASS X

Date: 18.12.23
No. of pages: 11

SET 1

Time: 3 hours
Max Marks: 80

General Instructions:

i. This question paper consists of 39 questions in 5 sections.
ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
iii. Section A consists of 20 objective type questions carrying 1 mark each.
iv. 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.
v. 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.
vi. 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.
vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION A

Select and write the most appropriate option out of the four options given for each of the questions 1 - 20.

Q.1 Which of the following element would form an alkali-
(a) Magnesium
(b) Aluminium
(c) Sodium
(d) Zinc (1 mark)

Q.2 Which of the following salts has no water of crystallisation?
(a) Blue vitriol
(b) Washing soda
(c) Baking soda
(d) Gypsum (1 mark)

Q.3 What type of chemical reactions take place when electricity is passed through water?

(a) Displacement
(b) Combination
(c) Decomposition
(d) Double displacement (1 mark)

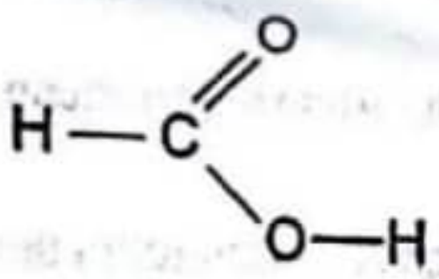
Q.4 The shiny finish on the walls after white wash is because of.

(a) Calcium oxide
(b) Calcium hydroxide
(c) Calcium Carbonate
(d) Calcium phosphate (1 mark)

Q5 Which of the following is used to oxidise ethanol to ethanoic acid?

(a) Alkaline $KMnO_4$
(b) Conc. H_2SO_4
(c) Acidified $KMnO_4$
(d) dilute H_2SO_4 (1 mark)

Q6



The above compound is

(a) Methanal
(b) Methanol
(c) Methanoic acid
(d) Methanone (1 mark)

Q7 Beakers A, B and C contain zinc sulphate, silver nitrate and iron (II) sulphate solutions respectively. Copper pieces are added to each beaker. Blue colour will appear in case of

(a) beaker A
(b) beaker B
(c) Beaker C
(d) all the beakers (1 mark)

Q8 Height of a plant is regulated by:

(a) DNA which is directly influenced by growth hormone.
(b) Genes which regulate the proteins directly.
(c) Growth hormones under the influence of the enzymes coded by a gene.
(d) Growth hormones directly under the influence of a gene (1 mark)

Q9 Some substances in the initial filtrate such as water and glucose are selectively reabsorbed as the filtrate from Bowman's capsule flows along the tubular parts of nephron. On which of the following factors, reabsorption of water depends?

(a) Amount of glucose present in the body
(b) Amount of excess water in the body
(c) Amount of dissolved waste to be excreted (1 mark)
(d) Both (b) and (c)

Q10 Which of the following features relates to biodegradable substances?

(a) Broken down by biological processes
(b) Remain inert
(c) Persist in environment for long time (1 mark)
(d) May harm the ecosystem

Q11 Which of the following is not the effect of adrenaline on our body?

(a)The breathing rate decreases because of the contractions of the diaphragm and the rib muscles.
(b)The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs.
(c) The blood gets diverted to our skeletal muscles. (1 mark)
(d) The heart beats faster, resulting in a supply of more oxygen to our muscles.

Q12 Reproduction is linked to the stability of the population of species. This is because

(a) The consistency of DNA copying during reproduction create new body design in species.
(b) The consistency of DNA copying during reproduction is important for the maintenance of body design.
(c)The consistency of DNA copying during reproduction does not maintain the body design.
(d)There is no consistency of DNA copying during reproduction. (1 mark)

Q13 When two unequal resistances are connected in series

(i) They have same current
(ii) They have same potential difference
(iii) Equivalent resistance is greater than greatest resistance
(iv) Equivalent resistance is less than the least resistance

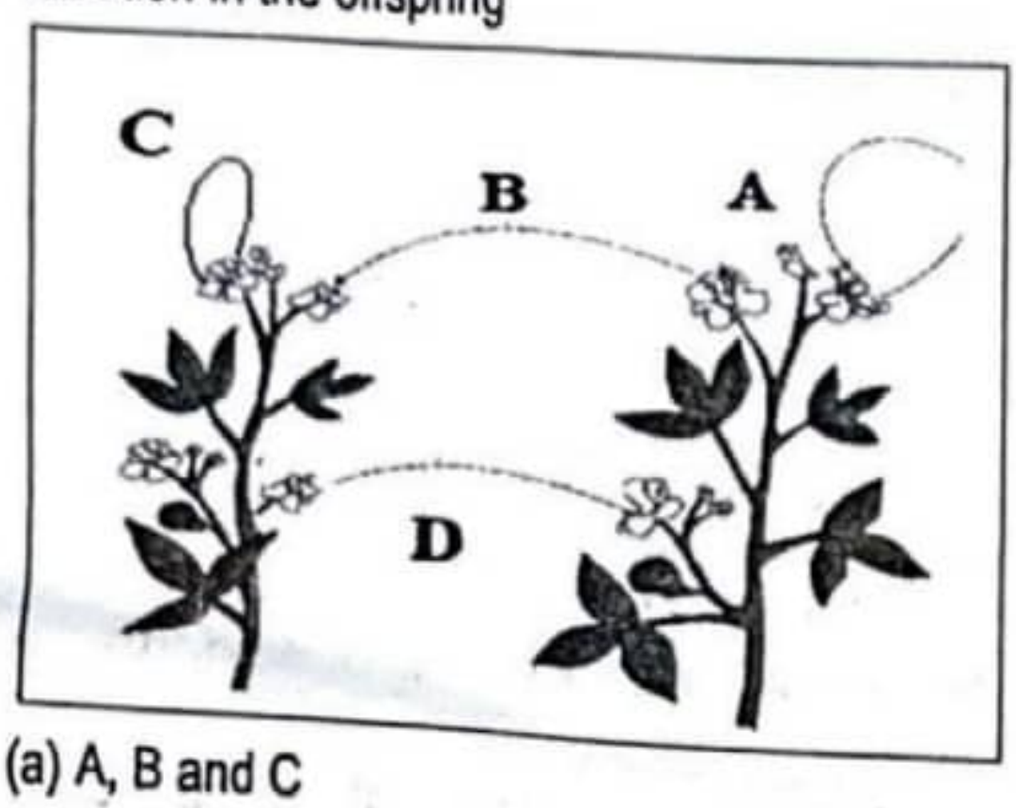
(a) (i) and (iii) are correct
(b) (ii) and (iv) are correct
(c) (i) is correct
(d) (iii) is correct (1 mark)

Q14 An image of an object produced on a screen which is about 36 cm using a convex lens. The image produced is about 3 times the size of the object. What is the size of the object?

(a) 12 cm
(b) 33 cm
(c) 39 cm
(d) 108 cm

(1 mark)

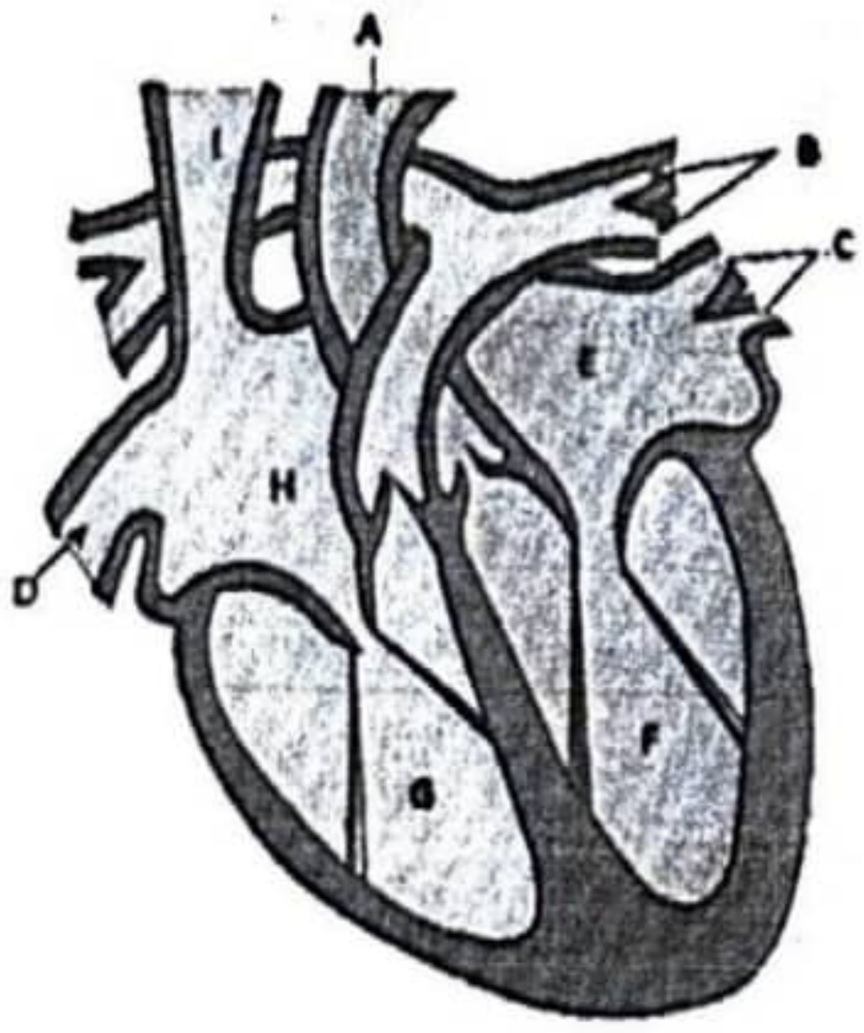
Q15 The diagram shown below depicts pollination. Choose the options that will show a maximum variation in the offspring



(a) A, B and C
(b) B and D
(c) B, C and D
(d) A and C

(1 mark)

Q16 Which of the following options lists parts of the human heart which carry oxygenated blood?



(a) A, E and G
(b) A, E and F
(c) I, H and G
(d) I, H and F

(1 mark)

For question numbers **17 to 20** , two statements are given-one labelled Assertion(A) and the other labelled Reason (R). Select the correct answer to these questions from the codes given below:

(a) Both A and R are true and R is the 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

Q17 **Assertion (A) :** It is advised that while diluting an acid one should add water to acid and not acid to water keeping the solution continuously stirred.
Reason (R) : The process of dissolving an acid into water is highly exothermic. (1 mark)

Q18 **Assertion (A) :**A normal human eye can clearly see all the objects at a different distance.
Reason (R): The human eye has the capacity to suitably adjust the focal length of its lens to a certain extent. (1 mark)

Q19 **Assertion(A):** Spirogyra reproduces by multiple fission.
Reason (R): Spirogyra breaks up into smaller pieces upon maturation. (1 mark)

Q20 **Assertion(A):** Resins and gums are stored in old xylem tissue in plants.
Reason(R): Old xylem facilitates the transport of food. (1 mark)

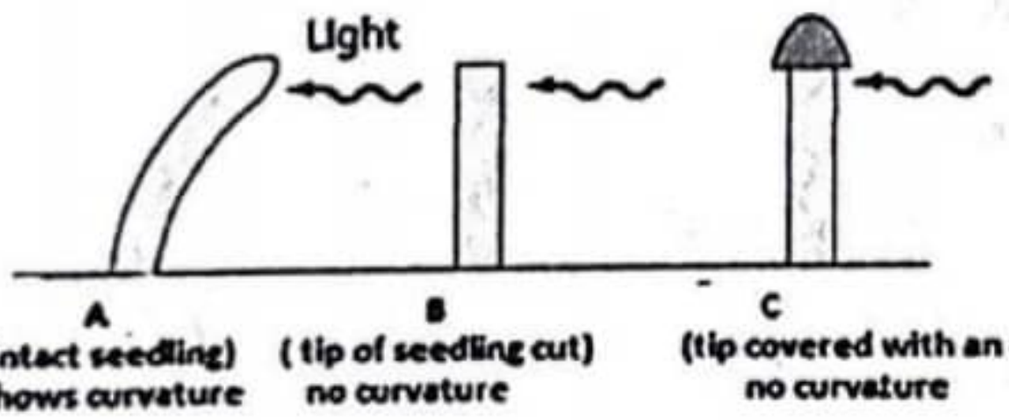
SECTION B

Question No. 21 to 26 are very short answer questions

Q.21 List two changes observed on heating the crystals of ferrous sulphate. (2 marks)

Q.22 Mustard was growing in two fields - A (inside a net house) and B (an open field). While field A produced brown coloured seeds, field B produced yellow coloured seeds. It was observed that in field A, the offspring showed only the parental trait for consecutive generations, whereas in field B, the majority of the offspring showed a variation in the progeny. What are the probable reasons for these? (2 marks)

Q23 The shoot tip of the seedlings when exposed to unilateral light grows towards the direction of light. (2 marks)



Explain the given phenomenon with respect to plant hormones.

OR

In 1987, an agreement was formulated by the United Nations Environment Programme (UNEP) to freeze the production of "X" to prevent depletion of "Y". Identify 'X' and 'Y' and explain the importance of 'Y' for human beings. (2 marks)

Q24 What are the different methods to increase the resistance of a conductor at a given temperature?

(2 marks)

Q25 Give two points of difference between convex lens and concave lens according to the image formed by them.

(2 marks)

OR

Give two points of difference between real image and virtual image according to the image formed by a spherical mirror.

(2 marks)

Q26 Person X suffers from a condition that affects the normal functioning of the pituitary gland. Which two ways can this condition directly affect the person 'X'? (2 marks)

SECTION C

Question No. 27 to 33 are short answer questions

Q27 (a) In electron dot structure, the valence shell electrons are represented by crosses or dots. Represent the formation of chlorine molecules with the help of electron dot structure.

(b) Write the general formula of alkenes and name the first member of the series.

(c)Which of the following does not belong to the same homologous series?

(i) CH_4

(ii) C_2H_6

(iii) C_3H_8

(iv) C_4H_8

(3 marks)

Q28 A metal "M" does not liberate hydrogen from dilute acids but reacts with oxygen when burnt to give a black coloured product "N". The metal "M" also reacts with carbon dioxide and moisture to form a compound "L" .

(a) Identify M and "N"

(b) Write the reactions of "M" with oxygen

(c) What would be the colour of the compound "L".

(3 marks)

OR

(a) List two differences between roasting and calcination.

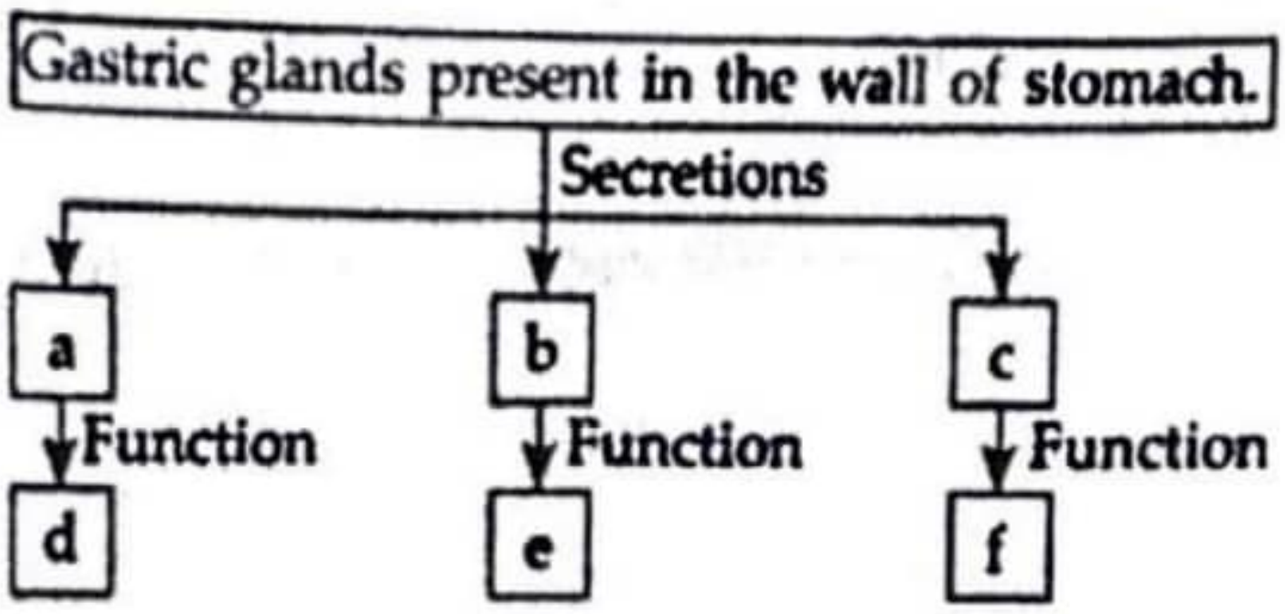
(b) Complete the following reaction

$HgS_{(s)} + O_2(g) \rightarrow$ _____ + _____ (3 marks)

Q29 Draw a neat-labelled diagram of stomata and explain the process of their opening and closing. (3 marks)

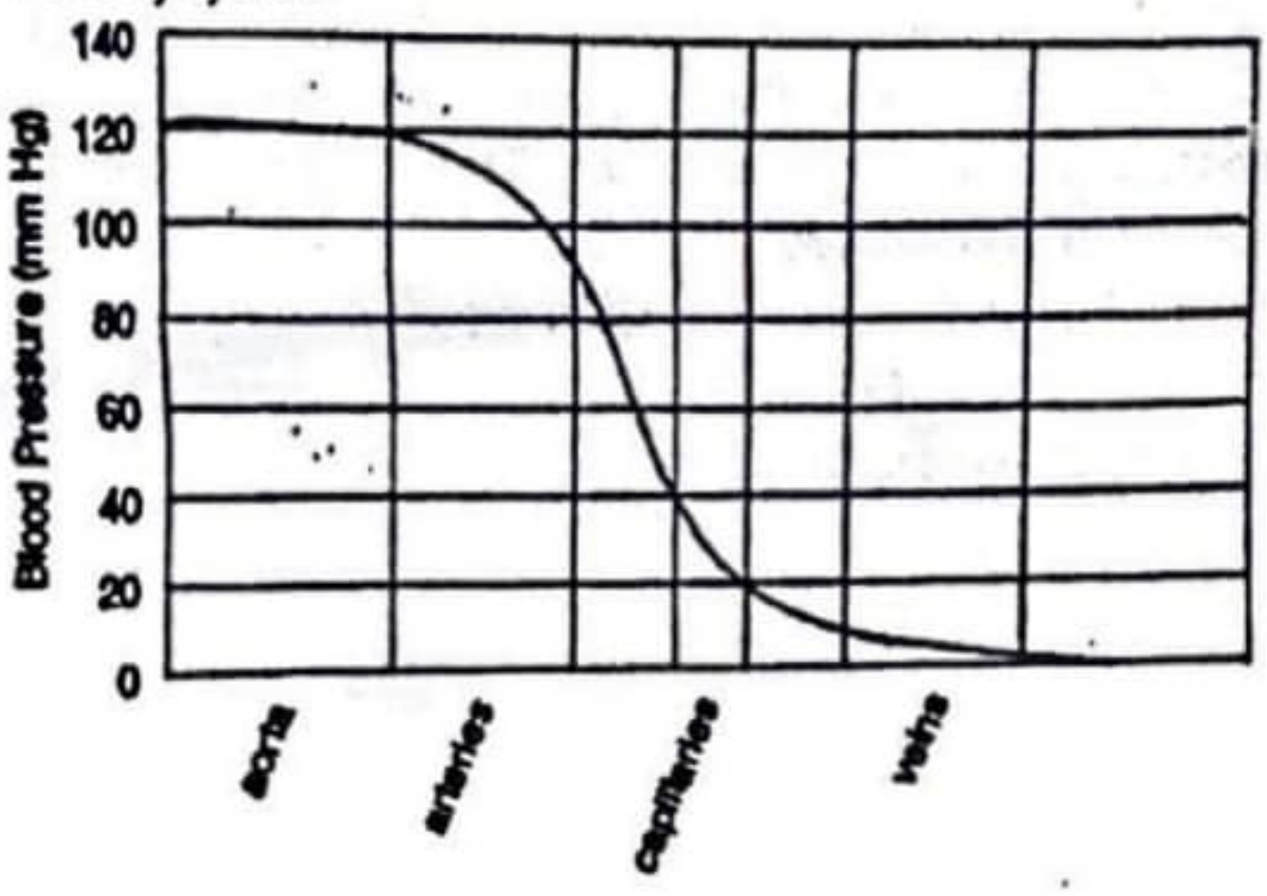
OR

Complete the following flow chart as per the given instructions to identify a, b, c, d, e, f.



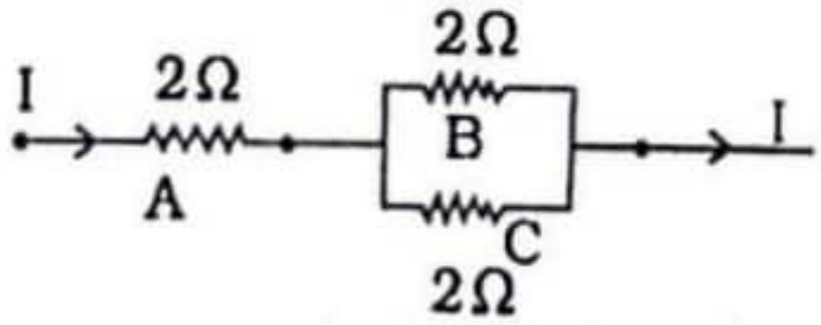
(3 marks)

Q30 Study the graph given below that represents the blood pressure in various blood vessels of the circulatory system.



(a) Compare the blood pressure of arteries with veins.
(b) How are arteries designed to bear the pressure of blood? Mention any two features.
(c) How do veins ensure the unidirectional flow of blood back to the heart? (3 marks)

Q31 Three 2 Ω resistors, A, B and C, are connected as shown in Figure. Each of them dissipates energy and can withstand a maximum power of 18 W without melting. Find the maximum current that can flow through the combination of three resistors. (3 marks)



Q32 A student wants to project the image of a candle flame on a screen 48 cm in front of a mirror by keeping the flame at a distance of 12 cm from its pole.
(a) Suggest the type of mirror he should use.
(b) Find the linear magnification of the image produced.
(c) How far is the image from its object?
(d) Find focal length of the mirror. (3 marks)

Q33 Name any two common defects of vision. What are their causes? Name the type of lens used to correct each of them. (3 marks)

SECTION D

Question No. 34 to 36 are long answer questions.

Q34 Draw a circuit diagram for a circuit consisting of a battery of 5 cells of 2 V each, a 5 Ω resistor, a 10 Ω resistor and a 15 Ω resistor, an ammeter and a plug key all connected in series. Also connect a voltmeter to record the potential difference across the 15 Ω resistor and calculate
(a) The current passing through the above circuit and
(b) Potential difference across the 5 Ω resistor when the key is closed. (5 marks)

OR

Define the following terms in the context of spherical mirrors:
(a) Pole
(b) Centre of curvature
(c) Principal axis
(d) Principal focus
(e) Focal length (5 marks)

Q35 Answer the following:
(a) Identify the parent acid and base which form magnesium chloride salt.
(b) Name the white powder added while baking bread and cakes to make them soft and fluffy. Give its composition also.
(c) A sample of silver chloride is exposed to sunlight. What is the colour change? Also name the type of reaction.
(d) How does a milkman shift the pH of fresh milk from 6 to slightly alkaline to prevent its spoiling.
(e) Give two important uses of Plaster of Paris. (5 marks)

OR

The industrial process used for manufacture of caustic soda involves electrolysis of a aqueous solution of compound X. In this process, two gases are released. Y is liberated at cathode. Z is liberated at anode which on treatment with dry slaked lime forms compound P.

(a) Name X,Y,Z and P.
(b) Name the process and give a balanced chemical equation for the above reaction.
(c) State one use of compound P (5 marks)

Q36 (a) State with reason any one possible consequence of the elimination of decomposers from the earth.
(b) Define the term biological magnification.
(c) How does the biological magnification affect the organisms belonging to different trophic levels, particularly the tertiary consumers?
(d) The following organisms form a food chain.
Insects, Hawk, Grass, Snake, Frog
Which of these will have the highest concentration of non-biodegradable chemicals and why? (5 marks)

. OR

(a) Name the human male reproductive organ that produces sperm and also secretes hormones. Write the function of the secreted hormone.
(b) Name the parts of the human female reproductive system where:
(i) fertilisation takes place.
(ii) implantation of the fertilised egg occurs.
(c) Explain how the embryo gets nourishment inside the mother's body. (5 marks)

SECTION E

Question 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.

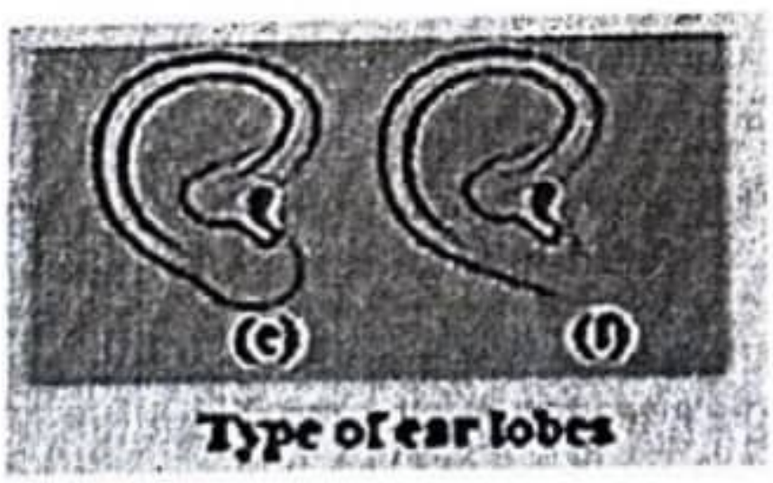
Q37 Figures (a) to (d) given below represent the type of ear lobes present in a family consisting of 2 children – Rahul, Nisha and their parents.


a) Rahul's father


b) Rahul


c) Rahul's mother


d) Rahul's sister Nisha



Excited by his observation of different types of ear lobes present in his family, Rahul conducted a survey of the type of ear lobes found (Figure (e) and (f)) in his classmates. He found two types of ear lobes in his classmates as per the frequency given below:

Sex	Free	Attach
Male	36	14
Female	31	19

On the basis of above data answer the following questions.

(a) Which of the two characteristics - 'free earlobe' or 'attached ear lobe' appears to be dominant in this case? Why?

(b) Is the inheritance of the free ear lobe linked with sex of the individual? Give reason for your answer.

(c) What type of ear lobe is present in father, mother, Rahul and his sister Nisha? Write the genetic constitution of each of these family members which explains the inheritance of this character in this family? (Gene for free ear lobe is represented by F and gene for attached ear lobe is represented by f for writing the genetic constitution).

OR

Suresh's parents have attached earlobes. What type of ear lobe can be seen in Suresh and his sister Siya? Explain by giving the genetic composition of all. (4 marks)

Q38 The domestic electric circuit consists of red insulated cover called live wire, wire with black insulation called neutral wire and the wire with green insulation is called Earth wire. We know that the fuse is connected in series with the circuit to prevent the damaging of electrical appliances and circuit from overloading. Overloading occurs when live wire and the neutral wire come in direct contact with each other. Because of which current through the circuit increases suddenly. Also, overloading may occur because of connecting many appliances to a single socket. The Earth wire which is green in colour is connected to a metal plate deep in the earth near the house. This type of safety measure is used in appliances like electric press, toaster, table fan, refrigerator etc. The Earth wire gives a low resistance conducting path for the electric current. In this way it protects us from severe electric shock.

All the appliances are connected in a parallel circuit so that the potential difference across each appliance will be the same.

Questions:

(a) What are the colours of live wire and neutral wire?

(b) In our country what is the potential difference between live wire and neutral wire?

(c) What is short circuiting?

OR

(c) What is the main purpose of using a fuse in an electric circuit? (4 marks)

Q39 Organic carbon compounds are far more numerous than inorganic carbon compounds.One such substance **'C'** belongs to a group of acids called carboxylic acids is used as a preservative. Another substance **'A'** is a good solvent and also used in medicines such as tincture iodine, cough syrups, and many tonics.

(i) 'C' has two carbon atoms; 'C' is obtained by the reaction of 'A' in presence of alkaline Potassium permanganate followed by acidification.

(ii) Misuse of 'A' in industries is prevented by adding Methanol, Benzene, and pyridine to 'A'.

(iii) 'F' is formed on heating 'A' in presence of conc Sulphuric acid.

(iv) 'F' reacts with Hydrogen gas in presence of Nickel and Palladium catalyst.

Based on the above hints answer the following questions

(a) Give the IUPAC names of A and F

(b) Illustrate with the help of chemical equations the changes taking place. (A → C and A →F)

OR

(b) Name the chemical reactions which occur in steps (i) and (iv). (4 marks)

**********ALL THE BEST**********