ARYAN INSTITUTE

Class: 10th **Subject: Science**

General Instruction : Read the following instructions carefully

I. The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All question are compulsory.
II. Section A – question no. 1 to 20 – all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion – reason type questions. Answers to these should be given in one word or one sentence.
III. Section B – question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.
IV. Section C – question no. 27 to 33 are short answer type question, carrying 3 marks each. Answers to these question should in the range of 50 to 80 words.
V. Section D – question no. 34 to 36 are long answer type question, carrying 5 marks each. Answers to these question should in the range of 80 to 120 words.
VI. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
VII. Wherever necessary, neat and properly labeled diagrams should be drawn.

Time : hrs. **Max. Marks:** 80

Section – A

1. Write the molecular formula of first two members of homologous series having functional group –Cl.

OR

Write the molecular formula of the 2nd and 3rdmember of the homologous series whose first member is ethane.

2. What is the primary function of kidney?
3. Write a balanced chemical equation that represents a photo-decomposition reaction.
4. What type of cells are lacking in a person who is colour blindness?
5. Define electric current.
6. Define are alloys commonly used in electrical heating devices? Give reason.

OR

Write the SI unit of resistivity.

7. Give reason for early sunrise and delayed sunset.
8. Which is the largest and most prominent part of the brain?
9. What is meant by optical centre of a lens?

OR

Can a convex mirror form a real image of an object?

10. Who is known as "Father of Genetics"?
11. What does anther contain?

OR

Name the parts of a carpel.

12. Why should biodegradable and non-biodegradable wastes to be discarded in two separate dustbins?

OR

Why are green plants called 'producers'?

13. Name one animal which regenerates from its cut body parts.

For question numbers 14-16, two statements are given – one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

(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.

14. **Assertion:** Carbon possesses property of catenation.
Reason: Carbon atoms form double as well as triple bonds during catenation.
15. **Assertion:** Blood is the circulatory fluid.
Reason: Blood has some advantage over water.

OR

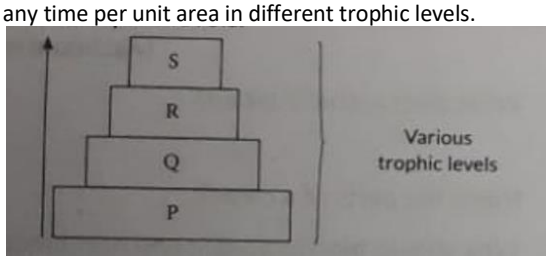
Assertion: Presence of HCl in stomach is necessary for the process of digestion.
Reason: HCl kills and inhibits the growth of bacteria in the stomach.

16. **Assertion:** Hibiscus is a bisexual flower.
Reason: Hibiscus has either stamens or carpels.

Answer Q. No. 17-20 contain five sub-parts each. You are expected to answer any four subparts in these questions.

17. **Read the following and answer any four questions from 17(i) to 17(v).**

The food can be transferred from one organism to the other through food chains. It represents the flow of energy in a given set of organisms. The various steps in a food chain, at which the transfer of food and takes place are called trophic levels. Given figure represents the graphic representation of total amount of living or organic matter is a grassland ecosystem at any time per unit area in different trophic levels.



(i) Which one of the following cannot come under R?
(a) Snake (b) Lizard (c) Eagle
(d) Frog
(ii) Which of the following belongs to Q?
(a) Rabbit (b) Grasshopper (c) Deer
(d) All of these
(iii) Rats belong to which trophic level?
(a) P (b) Q (c) R (d) S
(iv) What will happen if P are removed?
(a) No other organism will be able to exist.
(b) There will be no change in the food chain.
(c) The population of Q will increase.
(d) The population of S will not be affected.
(v) Which one of the following forms the fourth trophic level?
(a) Herbivores (b) Top carnivores
(c) Primary consumers (d) Producers

18. Read the following and answer any four questions from 18(i) to 18(v).

Question numbers 18(i)-18(v) are based on the table given below. Study this table related to the different types of reactions / processes and answer the questions that follow.

S. No.	Name of Process	Word equation
i.	Combination	Magnesium + Oxygen $\xrightarrow{heat}$ Magnesium oxide
ii.	Photosynthesis	Carbon dioxide + Water $\xrightarrow[chlorophyll]{sunlight}$ Glucose + Oxygen + Water
iii.	Combination	Iron + Sulphur $\xrightarrow{heat}$ Iron sulphide
iv.	Decomposition	Calcium carbonate $\xrightarrow{heat}$ Calcium oxide + Carbon dioxide

(i) The reaction in which two or more substances combine to form a single substance under suitable conditions is
(a) combination reaction (b) displacement reaction
(c) decomposition reaction (d) neutralization reaction.

(ii) Which of the following is essential for photosynthesis?
(a) Sunlight (b) Chlorophyll (c) Glucose
(d) Both 'a' and 'b'

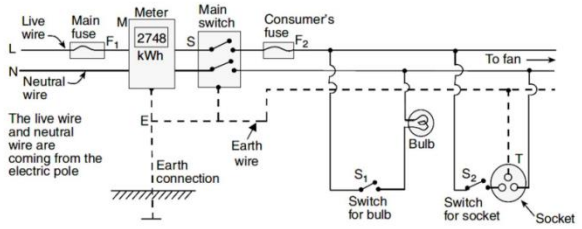
(iii) When a chemical compound decomposes on absorbing light and energy, then the reaction which takes place is known as
(a) photosynthesis (b) photodecomposition
(c) combination (d) thermal decomposition.

(iv) Which of the following reactions is an example of combustion reaction?
(a) $C_{(s)} + O_{2(g)} \longrightarrow CO_{2(g)}$
(b) $Zn_{(s)} + H_2SO_{4(oq)} \longrightarrow ZnSO_{4(oq)} + H_{2(g)}$
(c) $Zn_{(s)} + 2HCL_{(oq)} \longrightarrow ZnCl_{2(oq)} + H_{2(g)}$
(d) $3Mg_{(s)} + N_{2(g)} \longrightarrow Mg_3N_{2(s)}$

(v) Which of the following is an example of combination Reaction?
(a) $H_{2(g)} + Cl_{2(g)} \xrightarrow{light} 2HCl_{(g)}$
(b) $Fe_{(s)} + S_{(s)} \longrightarrow FeS_{(g)}$
(c) $2H_{2(g)} + O_{2(g)} \longrightarrow 2H_2O_{(f)}$
(d) All of them

19. Read the following and answer any four questions from 19(i) to 19(v).

In household electric circuits, the mains supply is delivered to our homes using three core cable as shown here. The cable consists of three wires, live wire, neutral wire and earth wire. The live wire is at potential difference of 220 V for the domestic supply and the potential difference between live and neutral wire is 220 volts. The live wire is connected to electric meter through a fuse or a circuit breaker of higher rating. The neutral wire is connected directly to the electric meter.



(i) Potential difference between live and neutral wire is
(a) 1000 V (b) 100 V (c) 500 V
(d) 220 V

(ii) Switches are connected in household circuit with which wire?
(a) Earth wire (b) Neutral wire (c) Live wire
(d) None of these

(iii) What is usual current rating of the fuse wire in the line if electric iron, geysers, room heater etc. are in use?
(a) 15 A (b) 5 A (c) 10 A
(d) 25 A

(iv) For all electrical appliances which property of circuit is recommended?
(a) Earthing (b) Neutralising (c) Connecting with fuse (d) None of these

(v) Home circuit is connected in parallel because
(a) In parallel circuit resistance is maximum
(b) In parallel circuit if one device is damaged, then it does not affect other devices
(c) Both of these
(d) None of these.

20. A concave lens is thick at the edges and thin at the centre while a convex lens is thick at the centre and thin at the edges. We can distinguish between a concave lens and a convex lens without touching them. For this keep a book close to a lens and observe the image of the text of the book through the lens. If the letters appear enlarged, then it is a convex lens and if the letters appear diminished then it is a concave lens. Convex lens converges light rays and hence known as converging lea. Similarly, concave lens diverges light rays and is known as diverging lens. Linear magnification produced by a lens is equal to the ratio of the image distance to the object distance. Power of a lens is defined as the reciprocal of its focal length.

(i) What type of image is always made by a concave lens?
(a) Real (b) Inverted (c) Virtual
(d) Enlarged

(ii) If magnification produced by a spherical lens is

+0.75, then what is the nature of the lens?
(a) Concave (b) Convex (c) Plane-concave
(d) Both (a) and (b)

(iii) What is the power of a convex lens with focal length 80 cm?
(a) 2.5 D (b) 1.50 D (c) 0.25 D
(d) 1.25 D

(iv) What kind of lens is present in human eye?
(a) Converging (b) Diverging (c) Both (a) and (b)
(d) None of these

(v) The lens which is thick at edges and thin at centre is
(a) bi-concave lens (b) concave lens (c) convex lens

(d) none of these

Section B

21. What is a synapse?

OR

Differentiate between dendrite and axon.

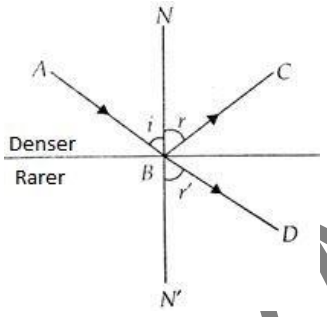
22. What is the difference between genetics and heredity?
23. In the given series of reaction, what are Y and Z respectively?

$$NaCl + H_2O + CO_2 + NH_3 \longrightarrow X + Y$$
$$\Delta \downarrow -H_2O, -CO_2$$
$$Q \xleftarrow{+10\ H_2O} Z$$

OR

Write the chemical formula of bleaching powder. How is bleaching powder prepared?

24. Name a metal which:
(i) is the best conductor of heat.
(ii) has a very low melting point.
(iii) does not react with oxygen even at high temperature.
(iv) is most ductile.
25. Explain the role of fuse in series with any electrical appliance in an electric circuit. Why should a fuse with defined rating for an electric circuit not be replaced by one with a larger rating?
26. A ray of light from a denser medium strikes a rarer medium at angle of incidence i as shown in figure. The reflected and refracted rays make an angle of 90° with each other. The angles of reflection and refraction are r and r'. Find sine of the critical angle C in terms of angler.



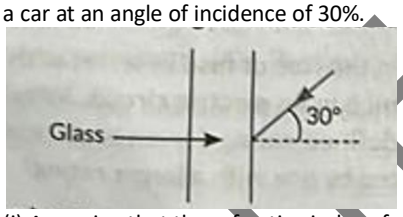
Section C

27. Explain the steps of digestion in the small intestine.

OR

(a) List the different ways in which glucose is axidised and provide energy in various organisms.
(b) What are the differences between the two ways of oxidation of glucose in organisms?

28. (a) Give differences between single circulation and double circulation
(b) Write the functions of plasma in blood.
29. (i) State two differences between budding in Hydra and budding in yeast.
(ii) How does Spirogyra reproduces?
30. Give three differences between the displacement and the double displacement reactions.
31. pH values for some solutions are given below:
(A) 6 (B) 10 (C) 1
(D) 7 (E) 13
(i) For each solution, say whether it is acidic alkaline, or neutral.
(ii) Pick out the most acidic and most alkaline solutions.
(iii) What colour does universal indicator show, in a neutral solution?
32. What are covalent bonds? Show their formation with the help of electron dot structure of methane. Why are covalent compounds generally poor conductors of electricity?
33. Figure shows a ray of light meeting the glass of the window of a car at an angle of incidence of 30%.



(i) Assuming that the refractive index of glass is 1.5, find the angle of refraction for this ray in the glass. (Given: sin (19.5°)=1/3)
(ii) Complete the diagram by sketching the path of the ray through the glass and out on the other side.
(iii) Use the diagram to explain the effect of the glass on what is seen by the driver.

Section – D

34. (i) What is aqua regia? Why are gold and platinum soluble in it?
(ii) An element E combines with oxygen to form an oxide E_2O which is a good conductor of electricity. Give the following information:
(a) How many electrons will be present in the valence shell of element E?
(b) Write the formula of the compound formed when the element E combines with chlorine.

OR

What happens when
(i) Calcium reacts with water
(ii) Iron reacts with steam
(iii) Magnesium reacts with hot water
(iv) Sodium reacts with water
Arrange the above metals in order of decreasing activity.

35. (i) Draw a diagram to show open stomatal pore and label on it:
(a) guard cells
(b) chloroplast
(ii) State two functions of stomata.
(iii) How do guard cells regulate the opening and closing of stomatal pore?
36. A current-carrying conductor kept in a magnetic field experience force. Why? On what factors does the direction of this force depend? State the rule used for determination of direction of this force.

OR

Briefly explain an activity to plot the magnetic field lines around a straight current carrying conductor. Sketch the field pattern for the same, specifying current and field directions. What happens to the field.
(i) if the strength of the current is decreased?
(ii) if the direction of the current is reversed?