

केन्द्रीय विद्यालय संगठन हैदराबाद संभाग

**KENDRIYA VIDYALAYA SANGATHAN  
HYDERABAD REGION**



छात्र सहायता सामग्री  
**STUDENT SUPPORT MATERIAL**

(2023-24)  
कक्षा 10 विज्ञान

**CLASS X SCIENCE**

दक्षता आधारित बहुविकल्पीय प्रश्न

**COMPETENCY BASED MCQs**

## OUR PATRONS

**DR D MANJUNATH**  
**DEPUTY COMMISSIONER**  
**KENDRIYA VIDYALAYA REGIONAL OFFICE**  
**HYDERABAD**

**SHRI T PRABHUDAS**  
**ASSISTANT COMMISSIONER**  
**KENDRIYA VIDYALAYA REGIONAL OFFICE**  
**HYDERABAD**

## OUR TEAM

|                         |                                      |
|-------------------------|--------------------------------------|
| <i>Jaya P Rajappan</i>  | <i>Principal KV NO2 Golconda</i>     |
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| <i>K Chandra Mohan</i>  | <i>TGT Science KV No 1 Uppal</i>     |
| <i>Suseela Putla</i>    | <i>TGT Science KV CRPF Barkas</i>    |
| <i>Mohammed Sheriff</i> | <i>TGT Science KV CRPF Barkas</i>    |
| <i>Radha Balli</i>      | <i>TGT Science KV Khammam</i>        |

## CURRICULUM- SCIENCE (2023-24)

(Code No. 086)

The subject of Science plays an important role in developing well-defined abilities in cognitive, affective and psychomotor domains in children. It augments the spirit of enquiry, creativity, objectivity and aesthetic sensibility.

Upper primary stage demands that a number of opportunities should be provided to the students to engage them with the processes of Science like observing, recording observations, drawing, tabulation, plotting graphs, etc., whereas the secondary stage also expects abstraction and quantitative reasoning to occupy a more central place in the teaching and learning of Science. Thus, the idea of atoms and molecules being the building blocks of matter makes its appearance as does Newton's law of gravitation.

The present syllabus has been designed around seven broad themes viz. Food; Materials; The World of The Living; How Things Work; Moving Things, People and Ideas; Natural Phenomenon and Natural Resources. Special care has been taken to avoid temptation of adding too many concepts than can be comfortably learnt in the given time frame. No attempt has been made to be comprehensive.

At this stage, while Science is still a common subject, the disciplines of Physics, Chemistry and Biology begin to emerge. The students should be exposed to experiences based on hands on activities as well as modes of reasoning that are typical of the subject.

General Instructions:

1. There will be an Annual Examination based on the entire syllabus.
2. The Annual Examination will be of 80 marks and 20 marks weightage shall be for Internal Assessment.
3. **For Internal Assessment:**
  - a. There will be Periodic Assessment that would include:
    - For 5 marks- Three periodic tests conducted by the school. Average of the best two tests to be taken that will have a weightage of 05 marks towards the final result.
    - For 5 marks- Diverse methods of assessment as per the need of the class dynamics and curriculum transaction. These may include - short tests, oral test, quiz, concept maps, projects, posters, presentations and enquiry based scientific investigations etc. and use rubrics for arguing them objectively. This will also have a weightage of 05 marks towards the final result.
  - b. Practical / Laboratory work should be done throughout the year and the student should maintain record of the same. Practical Assessment should be continuous. There will be weightage of 5 marks towards the final result. All practical listed in the syllabus must be completed.
  - c. Portfolio to be prepared by the student- This would include classwork and other sample of student work and will carry a weightage of 5 marks towards the final results.

**COURSE STRUCTURE CLASS X  
(Annual Examination)**

**Marks: 80**

| Unit No. | Unit                                     | Marks      |
|----------|--|------------|
| I        | Chemical Substances-Nature and Behaviour | 25         |
| II       | World of Living                          | 25         |
| III      | Natural Phenomena                        | 12         |
| IV       | Effects of Current                       | 13         |
| V        | Natural Resources                        | 05         |
|          | <b>Total</b>                             | <b>80</b>  |
|          | <b>Internal assessment</b>               | <b>20</b>  |
|          | <b>Grand Total</b>                       | <b>100</b> |

|                                       |   |
|---------------------------------------|---|
| <b>Theme:<br/>Materials</b>           | <p><b>Unit I : Chemical Substances - Nature and Behaviour</b></p> <ol style="list-style-type: none"> <li><b>Chemical reactions:</b> Chemical equation, Balanced chemical equation, implications of a balanced chemical equation, types of chemical reactions: combination, decomposition, displacement, double displacement, precipitation, endothermic exothermic reactions, oxidation and reduction.</li> <li><b>Acids, bases and salts:</b> Their definitions in terms of furnishing of H<sup>+</sup> and OH<sup>-</sup> ions, General properties, examples and uses, neutralization, concept of pH scale (Definition relating to logarithm not required), importance of pH in everyday life; preparation and uses of Sodium Hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.</li> <li><b>Metals and nonmetals:</b> Properties of metals and non-metals; Reactivity series; Formation and properties of ionic compounds; Basic metallurgical processes; Corrosion and its prevention.</li> <li><b>Carbon compounds:</b> Covalent bonding in carbon compounds. Versatile nature of carbon. Homologous series. Nomenclature of carbon compounds containing functional groups (halogens, alcohol, ketones, aldehydes, alkanes and alkynes), difference between saturated hydro carbons and unsaturated hydrocarbons. Chemical properties of carbon compounds (combustion, oxidation, addition and substitution reaction). Ethanol and Ethanoic acid (only properties and uses), soaps anddetergents.</li> </ol> |
| <b>Theme: The World of the Living</b> | <p><b>Unit II<br/>The World of Living</b></p> <ol style="list-style-type: none"> <li><b>Life processes:</b> 'Living Being'. Basic concept of nutrition, respiration, transport and excretion in plants and animals.</li> <li><b>Control and co-ordination in animals and plants:</b> Tropic movements in plants; Introduction of plant hormones; Control and co-ordination in animals: Nervous</li> </ol>   |

|                                     |  |
|-------------------------------------|--|
|                                     | <p>system; Voluntary, involuntary and reflex action; Chemical co-ordination: animal hormones.</p> <p>7. <b>Reproduction:</b> Reproduction in animals and plants (asexual and sexual) reproductive health - need and methods of family planning. Safe sex vs HIV/AIDS. Child bearing and women's health.</p> <p>8. <b>Heredity and Evolution:</b> Heredity; Mendel's contribution- Laws for inheritance of traits: Sex determination: brief introduction: <b>(Topics excluded - evolution; evolution and classification and evolution should not be equated with progress).</b></p>   |
| <b>Theme:<br/>Natural Phenomena</b> | <b>Unit III: Natural Phenomena</b>   |
|                                     | <p>9. Reflection of light by curved surfaces; Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification.<br/>Refraction; Laws of refraction, refractive index. Refraction of light by spherical lens; Image formed by spherical lenses; Lens formula(Derivation not required); Magnification. Power of a lens.</p> <p>10. Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses.<br/>Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life <b>(excluding colour of the sun at sunrise and sunset).</b></p>         |
| <b>Theme:<br/>How Things Work</b>   | <b>Unit IV: Effects of Current</b>   |
|                                     | <p>11. Electric current, potential difference and electric current. Ohm's law; Resistance, Resistivity, Factors on which the resistance of a conductor depends. Series combination of resistors, parallel combination of resistors and its applications in daily life. Heating effect of electric current and its applications in daily life. Electric power, Interrelation between P, V, I and R.</p> <p>12. Magnetic effects of current: Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid; Force on current carrying conductor, Fleming's Left Hand Rule, Direct current. Alternating current: frequency of AC. Advantage of AC over DC. Domestic electric circuits.</p> |
| <b>Theme:<br/>Natural Resources</b> | <b>Unit V: Natural Resources</b>   |
|                                     | Our environment: Eco-system, Environmental problems, Ozone depletion, waste production and their solutions. Biodegradable and non-biodegradable substances.  |

**Note for the Teachers:**

1. **The chapter Management of Natural Resources (NCERT Chapter 16) will not be assessed in the year-end examination.** However, learners may be assigned to read this chapter and encouraged to prepare a brief write up to any concept of this chapter in their Portfolio.  
This may be for Internal Assessment and credit may be given Periodic Assessment/Portfolio.
2. The NCERT text books present information in boxes across the book. These help students to get conceptual clarity. However, the information in these boxes would not be assessed in the year-end examination.

**PRACTICALS**

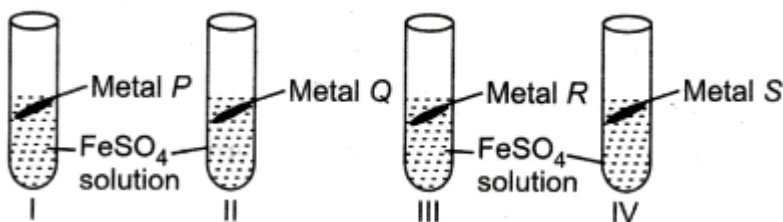
| <b>Sl. N</b> | <b>Unit</b> | <b>List of experiments</b>  |
|--------------|-------------|---|
| 1            | I           | A. Finding the pH of the following samples by using pH paper/universal indicator:<br>(i) Dilute Hydrochloric Acid<br>(ii) Dilute NaOH solution<br>(iii) Dilute Ethanoic Acid solution<br>(iv) Lemon juice<br>(v) Water<br>(vi) Dilute Hydrogen Carbonate solution<br>B. Studying the properties of acids and bases (HCl & NaOH) on the basis of their reaction with:<br>a) Litmus solution (Blue/Red)<br>b) Zinc metal<br>c) Solid sodium carbonate |
| 2.           | I           | Performing and observing the following reactions and classifying them into:<br>A. Combination reaction<br>B. Decomposition reaction<br>C. Displacement reaction<br>D. Double displacement reaction<br>(i) Action of water on quicklime<br>(ii) Action of heat on ferrous sulphate crystals<br>(iii) Iron nails kept in copper sulphate solution<br>(iv) Reaction between sodium sulphate and barium chloride solutions                              |
| 3.           | I           | Observing the action of Zn, Fe, Cu and Al metals on the following salt solutions<br>i) ZnSO <sub>4</sub> (aq)<br>ii) FeSO <sub>4</sub> (aq)<br>iii) CuSO <sub>4</sub> (aq)<br>iv) Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> (aq)<br>Arranging Zn, Fe, Cu and Al (metals) in the decreasing order of reactivity based on the above result.   |
| 4.           | IV          | Studying the dependence of potential difference (V) across a resistor on the current (I) passing through it and determine its resistance. Also plotting a graph between V and I.  |
| 5.           | IV          | Determination of the equivalent resistance of two resistors when connected in series and parallel.  |
| 6.           | II          | Preparing a temporary mount of a leaf peel to show stomata.   |
| 7.           | II          | Experimentally show that carbon dioxide is given out during respiration.  |
| 8.           | I           | Study of the following properties of acetic acid (ethanoic acid):<br>i) Odour<br>ii) solubility in water<br>iii) effect on litmus<br>iv) reaction with Sodium Hydrogen Carbonate  |
| 9.           | I           | Study of the comparative cleaning capacity of a sample of soap in soft and hard water.  |
| 10.          | III         | Determination of the focal length of:<br>i) Concave mirror<br>ii) Convex lens by obtaining the image of a distant object.   |
| 11.          | III         | Tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence. Measure the angle of incidence, angle of refraction, angle of emergence and interpret the result.  |
| 12.          | II          | Studying (a) binary fission in Amoeba, and (b) budding in yeast and Hydra with the help of prepared slides.   |
| 13.          | III         | Tracing the path of the rays of light through a glass prism.  |
| 14.          | II          | Identification of the different parts of an embryo of a dicot seed (Pea, gram or red kidney bean).  |

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| <b>Chapter 4:</b>  | <b>Carbon and its Compounds</b>              |
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| <b>Chapter 13:</b> | <b>Our Environment</b>                       |

## 1. CHEMICAL REACTIONS AND EQUATIONS

1. Study the given experimental set up.

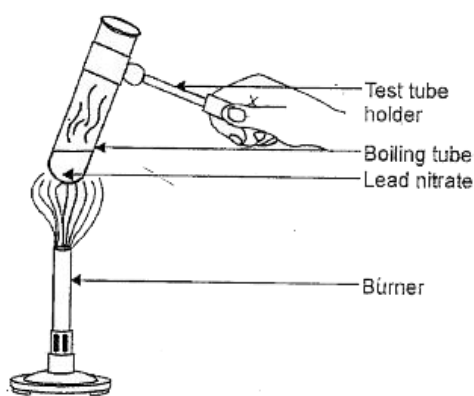


If in the test tubes I and III, black residue was obtained and in test tubes II and IV, no change was observed, then metals P, Q, R, and S could be respectively

- (a) Al, Cu, Pb, Ag  
(b) Pb, Cu, Ag, Al  
(c) Zn, Al, Cu, Ag  
(d) Zn, Cu, Al, Ag
2. Which of the following reactions are exothermic in nature?
- (i) Evaporation of water  
(ii) Dissolution of sodium hydroxide in water  
(iii) Dilution of sulphuric acid  
(iv) Dissolution of ammonium chloride in water  
(v) Combustion of methane gas
- (a) (i), (iv) and (v) only  
(b) (ii), (iii) and (v) only  
(c) (i), (ii) and (iv) only  
(d) (i), (iii) and (iv) only
3. Two colourless solutions X and Y were mixed together. On mixing, a yellow precipitate Z was formed. which of the following statements is correct regarding X, Y, and Z
- (a) X and Y were lead nitrate and potassium iodide solutions respectively.  
(b) X and Y were potassium chloride solution and water respectively. the yellow precipitate Z was lead iodide.  
(c) X and Y were sodium hydroxide solution and hydrochloric acid respectively and the yellow precipitate Z was sodium chloride.  
(d) X and Y were potassium hydroxide solution and nitric acid respectively and the yellow precipitate Z was potassium nitrate.
4. A small amount calcium oxide (quick lime) is taken in a beaker. Water is slowly added to this. which of the following observations is/are incorrect about this activity?
- (i) The beaker becomes hot because it is an endothermic reaction.  
(ii) A clear solution is obtained at the top after the reaction gets over.  
(iii) This reaction is a combination reaction in which quick lime (CaO) is converted into slaked lime, Ca(OH)<sub>2</sub>



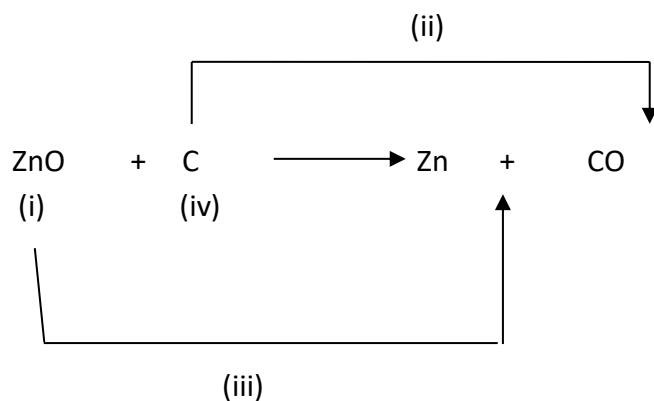
- (a) (i), (ii) and (iii)  
 (b) (ii) and (iii) only  
 (c) (i) only  
 (d) (i) and (iii) only
5. The chemical equations are balanced to satisfy one of the following laws in a chemical reactions, choose the correct option.  
 (a) Law of conservation of momentum  
 (b) Law of conservation of mass  
 (c) Law of conservation of motion  
 (d) Law of conservation of magnetism
6. The chemical reaction between two substances is characterized by change in color from orange to green. These two substances are most likely to be:  
 (a) potassium dichromate solution and sulphur dioxide  
 (b) Potassium permanganate solution and sulphur dioxide  
 (c) Potassium permanganate solution and lemon juice  
 (d) Potassium dichromate solution and carbon dioxide
7. A small amount of a light green colored compound X is heated in a test tube. In the beginning, it loses some water and then gas(es) Z with suffocating smell comes out. The vapours of gas(es) are collected and dissolved in water. The solution turns blue litmus red. The residue Y left in the test tube turns reddish brown. X, Y and Z could be respectively  
 (a)  $\text{PbSO}_4$ ,  $\text{Pb}_2\text{O}_2$  and  $\text{SO}_2$   
 (b)  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ ,  $\text{Fe}_2\text{O}_3$  and  $\text{SO}_2$ ,  $\text{SO}_3$   
 (c)  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ ,  $\text{Na}_2\text{SO}_4$  and  $\text{SO}_2$   
 (d)  $\text{Pb}(\text{NO}_3)_2$ ,  $\text{PbO}_2$ ,  $\text{NO}_2$ ,  $\text{N}_2\text{O}_4$
8. Observe the given figure carefully. Which of the following observation is/are correct?



*Heating of lead nitrate and emission of nitrogen dioxide*

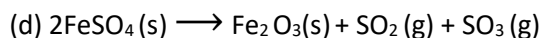
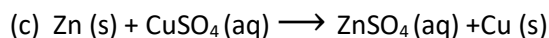
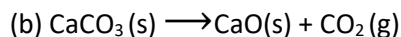
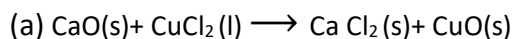
- I. Double decomposition reaction takes place  
 II. Brown fumes of  $\text{NO}_2$  are evolved  
 III. Red residue is left behind in the test tube  
 (a) I and III only  
 (b) II and III only

- (c) I and II only  
(d) II only
9. The respiration process during which glucose undergoes slow combustion by combining with oxygen in the cells of our body to produce energy, is a kind of:  
(a) Exothermic process  
(b) endothermic process  
(c) Reversible process  
(d) physical process
10. A chemical reaction does not involve  
(a) Formation of new substances having entirely different properties than that of the reactants  
(b) Breaking of old chemical bonds and formation of new chemical bonds  
(c)Rearrangement of the atoms of reactants to form new products  
(d)Changing of the atoms of one element into those of another element to form new products
11. Before burning in air, the magnesium ribbon is cleaned by rubbing with a sand paper to:  
(a) Make the ribbon surface shinier  
(b) Remove the layer of magnesium oxide from the ribbon surface  
(c) Remove the layer of magnesium carbonate from the ribbon surface  
(d) Remove the moisture from the ribbon surface
12. A student wrote three statements about rancidity:  
(i) When fats and oils are reduced, they become rancid.  
(ii) Chips manufacturers usually flush chips bags with oxygen to prevent rancidity  
(iii) Rancidity is prevented by adding substances called antioxidants to food.  
Choose the correct statement(s)  
(a) I only  
(b) II and III only  
(c) III only  
(d) I, II and III
13. The chemical reaction between quicklime and water is characterized by:  
(a) Evolution of hydrogen gas  
(b) Formation of slaked lime precipitate  
(c) Change in temperature of the mixture  
(d) Change in color of the product
14. Observe the given reaction carefully and identify (i),(ii),(iii) and (iv)



|     | (i)                 | (ii)      | (iii)     | (iv)                |
|-----|---------------------|-----------|-----------|---------------------|
| (a) | Undergoes oxidation | Oxidation | Reduction | Undergoes reduction |
| (b) | Reducing agent      | Reduction | Oxidation | Oxidising agent     |
| (c) | Oxidising agent     | Oxidation | Reduction | Reducing agent      |
| (d) | Undergoes reduction | Reduction | Oxidation | Undergoes oxidation |

15. Which among the following reactions represents a decomposition reaction?



16. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. which of the following correctly represents the type of the reaction involved?

(i) Displacement reaction

(ii) Precipitation reaction

(iii) combination reaction

(iv) Double displacement reaction

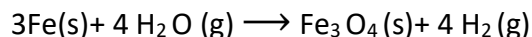
(a) (i) only

(b) (ii) only

(c) (iv) only

(d) (ii) and (iv) only

17. Which of the following statements about the given reaction are correct?



(i) Iron metal is getting oxidized

(ii) Water is getting reduced

(iii) Water is acting as a reducing agent.

(iv) Water is acting as an oxidising agent

(a) (i), (ii) and (iii)

(b) (iii) and (iv)

(c) (i), (ii) and (iv)

(d) (ii) and (iv)

18. To prevent chips from getting oxidized the bags of chips are flushed with

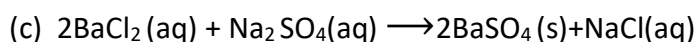
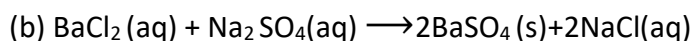
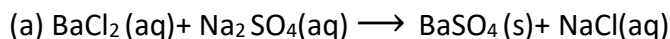
(a) hydrogen

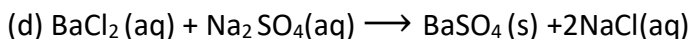
(b) Oxygen

(c) Carbon dioxide

(d) nitrogen

19. Identify the chemical equation which represents a complete balanced equation for the reaction of barium chloride with sodium sulphate to produce barium sulphate and sodium chloride.





20. Which of the following is (are) endothermic processes?
- (i) Dilution of sulphuric acid  
(ii) Sublimation of dry ice  
(iii) Condensation of water vapour  
(iv) Evaporation of water
- (a) (i) and (iii)  
(b) (ii) only  
(c) (iii) only  
(d) (ii) and (iv)
21. Solid calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form its solution called lime water. Which among the following is/are true about slaking of lime and the solution formed?
- (i) It is an endothermic reaction  
(ii) It is an exothermic reaction  
(iii) The pH of the resulting solution will be more than seven  
(iv) The pH of the resulting solution will be less than seven
- (a) (i) and (ii)  
(b) (ii) and (iii)  
(c) (i) and (iv)  
(d) (iii) and (iv)
22. In which of the following chemical equations, the abbreviations represent the correct states of the reactants and products involved at reaction temperature?
- (a)  $2\text{H}_2(\text{l}) + \text{O}_2(\text{l}) \longrightarrow 2\text{H}_2\text{O}(\text{g})$   
(b)  $2\text{H}_2(\text{g}) + \text{O}_2(\text{l}) \longrightarrow 2\text{H}_2\text{O}(\text{l})$   
(c)  $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{H}_2\text{O}(\text{l})$   
(d)  $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{H}_2\text{O}(\text{g})$
23. The following reaction is an example of a
- $$4\text{NH}_3(\text{g}) + 5\text{O}_2(\text{g}) \longrightarrow 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}(\text{g})$$
- (i) Displacement reaction  
(ii) Redox reaction  
(iii) Combination reaction  
(iv) neutralization reaction
- (a) (i) and (iv)  
(b) (ii) and (iii)  
(c) (i) and (iii)  
(d) (iii) and (iv)
24. A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?
- (a)  $\text{KMnO}_4$  is an oxidising agent, it oxidizes  $\text{FeSO}_4$   
(b)  $\text{FeSO}_4$  acts as an oxidising agent and oxidizes  $\text{KMnO}_4$   
(c) The colour disappears due to dilution, no reaction is involved

- (d)  $\text{KMnO}_4$  is an unstable compound and decomposes in presence of  $\text{KMnO}_4$  to a colourless compound.
25. Which among the following statement(s) is (are) true? Exposure of silver chloride to sunlight for a long duration turns grey due to
- (i) the formation of silver by decomposition of silver chloride
  - (ii) Sublimation of silver chloride
  - (iii) Decomposition of chloride gas from silver chloride
  - (iv) Oxidation of silver chloride
26. Some crystals of copper sulphate were dissolved in water. The colour of the solution obtained would be:
- (a) green
  - (b) Red
  - (c) Blue
  - (d) Brown
27. When dilute HCl is added to Zinc pieces taken in a test tube
- (a) No change take place
  - (b) the colour of the solution becomes yellow
  - (c) A pungent smelling gas gets liberated
  - (d) Small bubbles of  $\text{H}_2$  gas appear on the surfaces of zinc pieces.
28. In the reaction  $\text{PbO} + \text{C} \rightarrow \text{Pb} + \text{CO}$
- (a) PbO is oxidized
  - (b) C acts as an oxidising agent
  - (c) C acts as reducing agent
  - (d) Reaction does not represent redox reaction
29. Which of the following gases can be used for the storage of fresh sample of an oil for a longer time?
- (a) Carbon dioxide or oxygen
  - (b) Nitrogen or helium
  - (c) Helium or oxygen
  - (d) Nitrogen or oxygen
30. Which of the following reactions represents a combination reaction?
- (a)  $\text{CaO} (\text{s}) + \text{H}_2\text{O} (\text{l}) \rightarrow \text{Ca} (\text{OH})_2 (\text{aq})$
  - (b)  $\text{CaCO}_3 (\text{s}) \rightarrow \text{CaO} (\text{s}) + \text{CO}_2 (\text{g})$
  - (c)  $\text{Zn} (\text{s}) + \text{CuSO}_4 (\text{aq}) \rightarrow \text{ZnSO}_4 (\text{aq}) + \text{Cu} (\text{s})$
  - (d)  $2\text{FeSO}_4 (\text{s}) \rightarrow \text{Fe}_2\text{O}_3 (\text{s}) + \text{SO}_2 (\text{g}) + \text{SO}_3 (\text{g})$

#### CASE STUDY 1

#### Read the following and answer the questions:

Chemical equation is a method of representing a chemical reaction with the help of symbols and formulae of the substances involved in it. In a chemical equation, the substances which combine or react are called reactants and new substances produced are called products. A chemical equation is a short hand method of representing a chemical reaction. A balanced chemical equation has equal number of atoms of different elements in the reactants and products side. An unbalanced chemical equation has unequal number of atoms of one or more elements in

reactants and products. Formulae of elements and compounds are not changed to balance an equation.

31. Consider the following reaction:  
 $p\text{Mg}_3\text{N}_2 + q\text{H}_2\text{O} \rightarrow r\text{Mg}(\text{OH})_2 + s\text{NH}_3$   
When the equation is balanced, the coefficients p, q, r, s respectively is
- (a) 1,3,3,2
  - (b) 1,2,3,2
  - (c) 1,6,3,2
  - (d) 2,3,6, 2
32. Which of the following information is not conveyed by a balanced chemical equation?
- (a) Physical states of reactants and products
  - (b) Symbols and formulae of all the substances involved in a particular reaction
  - (c) Number of atoms/molecules of the reactants and products formed
  - (d) Whether a particular reaction is actually feasible or not
33. Which of the following chemical equations is an unbalanced one?
- (a)  $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$
  - (b)  $2\text{C}_4\text{H}_{10} + 12\text{O}_2 \rightarrow 8\text{CO}_2 + 10\text{H}_2\text{O}$
  - (c)  $2\text{Al} + 6\text{H}_2\text{O} \rightarrow 2\text{Al}(\text{OH})_3 + 3\text{H}_2$
  - (d)  $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$
34. Which of the following statements is/are correct?
- (a) A chemical equation tells us about the substances involved in a reaction.
  - (b) A chemical equation informs us about the symbols and formulae of the substances involved in a reaction.
  - (c) A chemical equation tells us about the atoms or molecules of the reactants and products involved in a reaction.
  - (d) All the above.

#### **CASE STUDY 2:**

**Read the following and answer the questions:**

A chemical reaction is a representation of chemical change in terms of symbols and formulae of reactants and products. There are various types of chemical reactions like combination, decomposition, displacement, double displacement, oxidation and reduction reactions. Reactions in which heat is released along with the formation of products are called exothermic chemical reactions. All combustion reactions are exothermic reactions

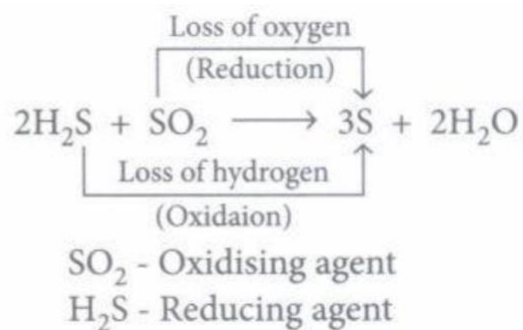
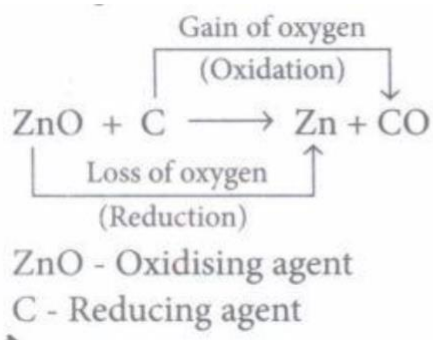
35. The chemical reaction in which a single substance breaks down into two or more simpler substances upon heating is known as
- (a) thermal decomposition reaction
  - (b) photo decomposition reaction
  - (c) electric decomposition reaction
  - (d) both (a) and (c)
36. A white salt on heating decomposes to give brown fumes and yellow residue is left behind. The yellow residue left is of
- (a) lead nitrate
  - (b) nitrogen oxide

- (c) lead oxide  
(d) oxygen gas
37. Complete the following statements by choosing correct type of reaction for X and Y.  
**Statement 1:** The heating of lead nitrate is an example of 'X' reaction.  
**Statement 2:** The burning of magnesium is an example of 'Y' reaction.  
 (a) X- Combination, Y- Decomposition  
 (b) X- Decomposition, Y-Combination  
 (c) X- Combination, Y-Displacement  
 (d) X- Displacement, Y-Decomposition
38. The massive force that pushes the rocket forward through space is generated due to the  
 (a) combination reaction  
 (b) decomposition reaction  
 (c) displacement reaction  
 (d) double displacement reaction

CASE STUDY :3

**Read the following and answer the questions:**

The earlier concept of oxidation and reduction is based on the addition or removal of oxygen or hydrogen elements so, in terms of oxygen and hydrogen, oxidation is addition of oxygen to a substance and removal of hydrogen from a substance. On the other hand, reduction is addition of hydrogen to a substance and removal of oxygen from a substance. The substance which gives oxygen to another substance or removes hydrogen from another substance in an oxidation reaction is known as oxidising agent, while the substance which gives hydrogen to another substance or removes oxygen from another substance in a reduction reaction is known as reducing agent.



39. A redox reaction is one in which  
 (a) both the substances are reduced  
 (b) both the substances are oxidised  
 (c) an acid is neutralised by the base  
 (d) one substance is oxidised while the other is reduced.
40. In the reaction,  $\text{H}_2\text{S} + \text{Cl}_2 \rightarrow \text{S} + 2\text{HCl}$   
 (a)  $\text{H}_2\text{S}$  is the reducing agent.  
 (b)  $\text{HCl}$  is the oxidising agent.

(c) H<sub>2</sub>S is the oxidising agent.

(d) Cl<sub>2</sub> is the reducing agent.

41. Which of the following processes does not involve either oxidation or reduction?

(a) Formation of slaked lime from quick lime.

(b) Heating mercuric oxide.

(c) Formation of manganese chloride from manganese oxide (MnO<sub>2</sub>).

(d) Formation of zinc from zinc blende.

42.  $Mg + CuO \rightarrow MgO + Cu$

Which of the following is wrong relating to the above reaction?

(a) CuO gets reduced

(b) Mg gets oxidised.

(c) CuO gets oxidised.

(d) It is a redox reaction.

CASE STUDY :4

Those reactions in which two compounds react by an exchange of ions to form two new compounds are called double displacement reactions. A double displacement reaction usually occurs in solution and one of the products, being insoluble, precipitates out (separates as a solid). Any reaction in which an insoluble solid (called precipitate) is formed that separates from the solution is called a precipitation reaction. The reaction in which acid or acidic oxide reacts with base or basic oxide to form salt and water is called neutralisation reaction.

For example,  $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

43. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained, and the sulphuric acid so formed remains in the solution. The reaction is an example of a

(a) combination reaction

(b) displacement reaction

(c) decomposition reaction

(d) double displacement reaction

44. Barium chloride on reaction with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?

(I) Displacement reaction

(II) Precipitation reaction

(III) Combination reaction

(IV) Double displacement reaction

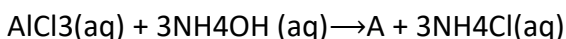
(a) (I) only

(b) (II) only

(c) (III) and (IV) only

(d) (II) and (IV) only

45. Identify A in the following reaction.





- (a) Al(OH)<sub>3</sub> (b) Al<sub>2</sub>O<sub>3</sub> (c) AlH<sub>3</sub> (d) AlN
46. Consider the following reaction,  
 $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$   
 identify the precipitate in the reaction,  
 (a) BaCl<sub>2</sub>  
 (b) BaSO<sub>4</sub>  
 (c) Na<sub>2</sub>SO<sub>4</sub>  
 (d) NaCl
47. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is:  
 (a) 1: 1 (b) 2:1 (c) 4:1 (d) 1:2
48. Identify 'x', 'y' and 'z' in the following balanced reaction.  $x \text{Pb}(\text{NO}_3)_2 \text{ (s)} \rightarrow y \text{PbO} + z \text{NO}_2 + \text{O}_2$   
 (a) 2, 4, 2  
 (b) 2, 2, 4  
 (c) 2, 4, 4  
 (d) 4, 2, 2
49. A substance 'X' is used in white-washing and is obtained by heating limestone in the absence of air. Identify 'X'.  
 (a) CaOCl<sub>2</sub>  
 (b) Ca(OH)<sub>2</sub>  
 (c) CaO  
 (d) CaCO<sub>3</sub>
50. Which option shows oxidation?  
 (a)  $\text{Zn} \rightarrow \text{Zn}^{2+}$   
 (b)  $2\text{H}^+ \rightarrow \text{H}_2$   
 (c)  $\text{Zn}^{2+} \rightarrow \text{Zn}$   
 (d)  $\text{H}_2 \rightarrow 2\text{H}$

### ANSWERS

| Question No | Ans | Question No | Ans | Question No | Ans | Question No | Ans | Question No | Ans |
|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
| 1           | d   | 11          | c   | 21          | b   | 31          | b   | 41          | a   |
| 2           | b   | 12          | c   | 22          | d   | 32          | d   | 42          | c   |
| 3           | a   | 13          | c   | 23          | c   | 33          | b   | 43          | d   |
| 4           | c   | 14          | c   | 24          | a   | 34          | d   | 44          | d   |
| 5           | b   | 15          | d   | 25          | a   | 35          | a   | 45          | a   |
| 6           | a   | 16          | d   | 26          | c   | 36          | c   | 46          | b   |
| 7           | b   | 17          | c   | 27          | d   | 37          | b   | 47          | b   |
| 8           | d   | 18          | d   | 28          | c   | 38          | b   | 48          | b   |
| 9           | a   | 19          | d   | 29          | b   | 39          | d   | 49          | c   |
| 10          | d   | 20          | d   | 30          | a   | 40          | a   | 50          | a   |

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## 2. ACIDS, BASES, AND SALTS

- Which of the following best describes a neutralization reaction?
  - A reaction between two acids
  - A reaction between two bases
  - A reaction between an acid and a base
  - A reaction between a metal and a non-metal
- What are the products of a neutralization reaction between hydrochloric acid (HCl) and sodium hydroxide (NaOH)?
  - HCl and NaOH
  - H<sub>2</sub>O and NaCl
  - H<sub>2</sub>O and HCl
  - NaCl and NaOH
- Which of the following is not true about neutralization reactions?
  - They involve the transfer of protons (H<sup>+</sup> ions)
  - They result in the formation of water and a salt
  - They release heat energy
  - They always produce a pH of 7
- Which of the following applications does not involve neutralization reactions?
  - Antacid medications
  - Wastewater treatment
  - Electrolysis
  - Household cleaning products
- What is the purpose of antacid medications?
  - To neutralize excess stomach acid
  - To increase stomach acid production
  - To treat bacterial infections
  - To decrease blood pH
- Plaster of Paris,  
Plaster of Paris is produced by:
  - Heating gypsum at high temperatures
  - Mixing gypsum with water
  - Grinding gypsum into a fine powder
  - Adding additives to gypsum
- Which material releases water vapor when exposed to fire?
  - Plaster of Paris
  - Gypsum
  - Both materials release water vapor
  - Neither material releases water vapor
- Sodium carbonate is a basic salt because it is a salt of  
Strong acid strong base  
Weak acid weak base  
Strong acid weak base

Weak acid strong base

- 9.** Gypsum is used in agricultural settings to:  
a) Improve soil quality b) Enhance plant growth  
c) Provide water retention d) Increase acidity in the soil
- 10.** Plaster of Paris sets quickly due to:  
a) Absorption of water b) Evaporation of water  
c) Chemical reactions with air d) Addition of reinforcing fibres
- 11.** The Chlor-Alkali Process  
What environmental concern is associated with the chlor-alkali process?  
a) Release of toxic chlorine gas b) Overproduction of hydrogen gas  
c) Generation of excessive heat d) Contamination of water sources
- 12.** Which gas produced in the chlor-alkali process finds applications in fuel cells?  
a) Chlorine gas b) Sodium hydroxide  
c) Hydrogen gas d) Oxygen gas
- 13.** What is the function of the cathode in the chlor-alkali process?  
a) It produces chlorine gas b) It produces sodium hydroxide  
c) It produces hydrogen gas d) It releases chloride ions
- 14.** What is the primary purpose of the chlor-alkali process?  
a) Production of chlorine gas b) Production of sodium hydroxide  
c) Production of hydrogen gas d) All of the above
- 15.** What is the primary purpose of using sodium hydroxide in the paper and pulp industry?  
a) Bleaching of paper b) pH adjustment  
c) Ink removal d) Fibre strengthening
- 16.** What is water of crystallization?  
a) Water that is physically trapped within a crystal  
b) Water that is chemically bound within a crystal  
c) Water vapor present in the surrounding environment  
d) Water used to dissolve crystals
- 17.** The removal of water of crystallization from a hydrate is called:  
(a) Dehydration b) Hydration c) Condensation d) Evaporation
- 18.** The presence of water of crystallization can affect the physical properties of a compound, such as:  
a) Colour and texture b) Melting point and boiling point
- 19.** c) Density and solubility d) All of the above

The following change could be observed when a dehydrated compound is exposed to moisture or water vapor?

- a) It loses its crystal structure

- b) It regains water of crystallization and becomes hydrated again c) It becomes an anhydrous compound permanently  
20. d) It forms a different chemical compound
- When a hydrate is heated and loses its water of crystallization, it forms:  
a) An anhydrous compound b) A hydrated compound  
c) A different crystal structure d) A gas
21. What does the pH scale measure?  
a) Temperature of a solution b) Acidity or basicity of a solution  
c) Concentration of dissolved ions in a solution  
d) Density of a solution
22. Which of the following substances is commonly used as a pH indicator?  
(a) Sodium chloride b) Sugar c) Litmus paper d) Oxygen gas
23. Which of the statements below explain the significance of pH in biological systems?  
(a) pH affects chemical reactions b) pH influences enzyme activity c) pH determines biological processes d) All of the above
24. Why is understanding pH important in everyday life?  
a) It helps maintain the pH balance of swimming pools  
b) It is crucial for successful gardening and agriculture  
c) It affects the effectiveness of cleaning agents  
d) All of the above
25. Why is understanding pH important in everyday life?  
a) It affects chemical reactions and biological processes  
b) It helps determine the colour of a solution  
c) It determines the temperature of a solution  
d) It is used to measure the volume of a solution
26. Which of the following is a characteristic of acids?  
a) They turn blue litmus paper red.  
b) They feel slippery to the touch.  
c) They have a bitter taste.  
d) They release hydroxide ions ( $\text{OH}^-$ ) in water.
27. Which of the following is a characteristic of bases?  
a) They taste sour  
b) They have a pH value greater than 7.  
c) They release hydrogen ions ( $\text{H}^+$ ) in water.  
d) They react with metals to produce hydrogen gas.
28. What is the pH value of a neutral substance?  
a) 0 b) 1 c) 7 d) 14
29. Which of the following is an example of an acid?  
a) Sodium hydroxide ( $\text{NaOH}$ ) b) Calcium carbonate ( $\text{CaCO}_3$ )  
c) Hydrochloric acid ( $\text{HCl}$ ) d) Sodium chloride ( $\text{NaCl}$ )
30. When an acid reacts with a base, what is formed?  
a) Salt and water                      b) Salt and carbon dioxide  
c) Salt and hydrogen gas          d) Salt and oxygen gas

31. What is the chemical formula for hydrochloric acid?  
a)  $\text{H}_2\text{SO}_4$  b)  $\text{HNO}_3$  c)  $\text{HCl}$  d)  $\text{H}_3\text{PO}_4$
32. Which of the following is a characteristic of salts?  
a) They have a sour taste.  
b) They turn red litmus paper blue.  
c) They release hydrogen ions ( $\text{H}^+$ ) in water.  
d) They are formed from the reaction of an acid and a base.
33. Which of the following is a common salt?  
a) Sodium hydroxide                      b) Calcium carbonate  
c) Sodium chloride                        d) Potassium permanganate
34. Which of the following is a weak acid?  
a) Hydrochloric acid ( $\text{HCl}$ ) b) Sulfuric acid ( $\text{H}_2\text{SO}_4$ )  
c) Nitric acid ( $\text{HNO}_3$ )                  d) Acetic acid ( $\text{CH}_3\text{COOH}$ )
35. Which of the following substances is a natural indicator for acids and bases?  
a) Litmus paper                              b) Phenolphthalein  
c) Methyl orange                          d) Universal indicator
36. Which of the following is a characteristic property of salts?  
a) Sour taste b) Slippery feel c) High pH d) Crystalline structure
37. Which of the following substances is a natural indicator of acids and bases?  
a) Methyl orange b) Litmus paper c) Phenolphthalein d) Universal indicator
38. Which of the following substances is produced when a metal reacts with an acid?  
a) Salt    b) Water  
c) Carbon dioxide gas                  d) None of the above
39. When hydrogen chloride gas is prepared on a humid day, the gas is usually passed through the guard tube containing calcium chloride. The role of calcium chloride taken in the guard tube is to  
(a) absorb the evolved gas  
(b) moisten the gas  
(c) absorb moisture from the gas  
(d) absorb  $\text{Cl}^-$  ions from the evolved gas
40. Which one of the following salts does not contain water of crystallisation?  
(a) Blue vitriol  
(b) Baking soda  
(c) Washing soda  
(d) Gypsum
41. In terms of acidic strength, which one of the following is in the correct increasing order?  
(a) Water < Acetic acid < Hydrochloric acid  
(b) Water < Hydrochloric acid < Acetic acid  
(c) Acetic acid < Water < Hydrochloric acid  
(d) Hydrochloric acid < Water < Acetic acid
42. What is formed when zinc reacts with sodium hydroxide?  
(a) Zinc hydroxide and sodium  
(b) Sodium zincate and hydrogen gas  
(c) Sodium zinc-oxide and hydrogen gas  
(d) Sodium zincate and water
43. Tomato is a natural source of which acid?  
(a) Acetic acid  
(b) Citric acid

- (c) Tartaric acid  
 44. (d) Oxalic acid  
 At what temperature is gypsum heated to form Plaster of Paris?  
 (a) 90°C  
 (b) 100°C  
 (c) 110°C

45. (d) 120°C  
 Alkalis are  
 (a) acids, which are soluble in water  
 (b) acids, which are insoluble in water  
 (c) bases, which are insoluble in water  
 (d) bases, which are soluble in water

**ASSERTION AND REASONING QUESTIONS**

Following questions 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 but R is not the correct explanation of A.  
 (c) A is true but R is false.

46. (d) A is false but R is true.  
 Assertion (A) : The acid must always be added to water with constant stirring.  
 47. Reason (R) : Mixing of an acid with water decreases the concentration of H<sup>+</sup> ions per unit volume.  
 Assertion (A) : The aqueous solutions of glucose and alcohol do not show acidic character.  
 48. Reason (R) : Aqueous solutions of glucose and alcohol do not give H<sup>+</sup> ions.  
 Assertion (A) : Weak acids have low electrical conductivity.  
 Reason (R) : Strong acids and weak acids have equal concentration of hydrogen ions in their solutions.  
 49. Assertion(A): Acids turn blue litmus paper red.  
 50. Reason(R): Acids are substances that release hydrogen ions (H<sup>+</sup>) in water.  
 Assertion(A): Salts are formed by the combination of acids and bases. Reason(R): During a neutralization reaction, hydrogen ions (H<sup>+</sup>) from acids combine with hydroxide ions (OH<sup>-</sup>) from bases to form water and a salt.

**ANSWERS**

| Q NO | Ans | Q NO | Ans | Q NO | Ans | Q NO | Ans | Q NO | Ans |
|------|-----|------|-----|------|-----|------|-----|------|-----|
| 1.   | c   | 11.  | a   | 21.  | b   | 31.  | c   | 41.  | a   |
| 2.   | B   | 12.  | c   | 22.  | c   | 32.  | d   | 42.  | b   |
| 3.   | d   | 13.  | c   | 23.  | d   | 33.  | c   | 43.  | d   |
| 4.   | c   | 14.  | d   | 24.  | d   | 34.  | d   | 44.  | b   |
| 5.   | a   | 15.  | a   | 25.  | a   | 35.  | a   | 45.  | d   |
| 6.   | a   | 16.  | b   | 26.  | a   | 36.  | d   | 46.  | b   |
| 7.   | b   | 17.  | a   | 27.  | b   | 37.  | b   | 47.  | a   |
| 8.   | d   | 18.  | d   | 28.  | c   | 38.  | a   | 48.  | c   |
| 9.   | a   | 19.  | b   | 29.  | c   | 39.  | c   | 49.  | a   |
| 10.  | a   | 20.  | a   | 30.  | c   | 40.  | b   | 50.  | a   |

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### 3. METALS AND NON-METALS

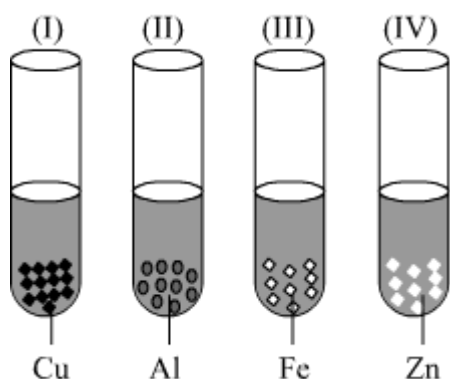
- 1 Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?
- (i) Good thermal conductivity  
(ii) Malleability  
(iii) Ductility  
(iv) High melting point
- (A) (i) & (ii)    (B) (i) & (iii)    (C) (ii) & (iii)    (D) (i) & (iv)
- 2 The electronic configuration of three elements 'P', 'Q' and 'R' are P- 2,8. Q- 2,8,7. R- 2,8,3. Which of the given is correct?
- (A) P is a metal                                  (B) Q is a metal  
(C) R is a non-metal                              (D) Q is a non-metal and R is a metal
- 3 Which among the given statements is incorrect for magnesium metal?
- (A) It burns in oxygen with a dazzling white flame  
(B) It reacts with cold water to form magnesium oxide and evolves hydrogen gas  
(C) It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas  
(D) It reacts with steam to form magnesium hydroxide and evolves hydrogen gas
- 4 What happens when calcium is treated with water?
- (i) It does not react with water  
(ii) It reacts violently with water  
(iii) It reacts less violently with water  
(iv) Bubbles of hydrogen gas formed stick to the surface of calcium
- (A) (i) & (iv)  
(B) (ii) & (iii)  
(C) (i) & (ii)  
(D) (iii) & (iv)
- 5 Which of the following is the correct arrangement of the given metals in ascending order of their reactivity?
- Zinc, Iron, Magnesium, Sodium
- (A) Zinc > Iron > Magnesium > Sodium

(B) Sodium > Magnesium > Iron > Zinc

(C) Sodium > Zinc > Magnesium > Iron

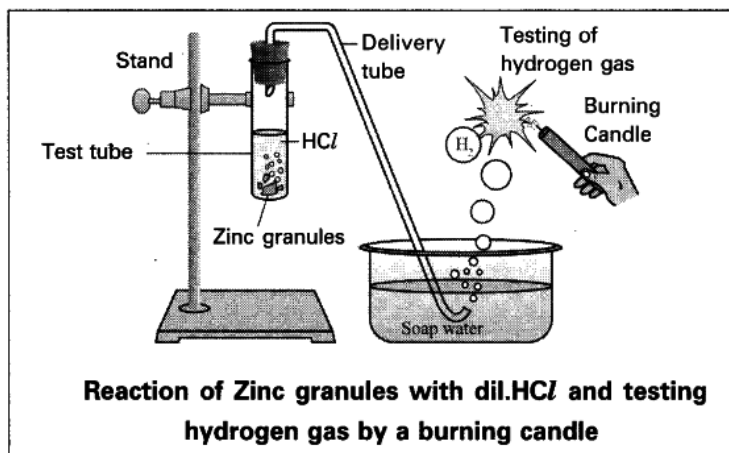
(D) Sodium > Magnesium > Zinc > Iron

- 6 Latha takes Cu, Al, Fe and Zn strips separately in four test-tubes labelled as I, II, III and IV respectively. He adds 10 ml of freshly prepared ferrous sulphate solution to each test-tube and observes the colour of the metal in each case. she would observe a black residue in:



(A) (I) and (II)      (B) (II) and (III)      (C) (II) and (IV)      (D) (I) and (IV)

- 7 Study the diagram given below and identify the gas formed in the reaction.



(a) Carbon di-oxide which extinguishes the burning candle.

(b) Oxygen due to which the candle burns more brightly.

(c) Sulphur dioxide which produces a suffocating smell.

(d) Hydrogen which while burning produces a popping sound.

- 8 In thermite welding a mixture of ..... and ..... is ignited with a burning magnesium ribbon which produces molten iron metal as large amount of heat is evolved.



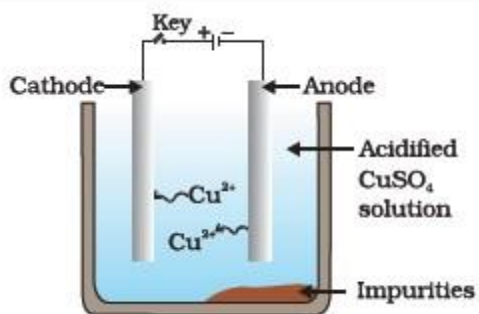
- (A) iron (III) oxide and aluminium powder  
 (B) iron (II) oxide and aluminium powder  
 (C) iron (III) chloride and aluminium powder  
 (D) iron (III) sulphate and aluminium powder
- 9 An element X is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following:  
 (A) Mg (B) Na (C) P (D) Ca<sub>3</sub>
- 10 Reaction between X and Y forms compound Z and X loses electron and Y gains electron. Which of the following properties is Not shown by Z?  
 (A) Has high melting point (B) Insoluble in water  
 (C) Conducts electricity in molten state (D) Occurs as solid
- 11 A strip of copper was placed in a beaker containing zinc sulphate solution. On observing the strip the next day, it was noticed that  
 (A) the copper strip remained as it was (B) the copper strip became thinner (C) the copper strip became thicker (D) the colour of the strip changed
- 12 Reaction between K and L, forms compound M. K loses electron and L gains electron. Which of the given properties is not shown by Z?  
 (A) Has high melting point (B) Has low melting point  
 (C) Conducts electricity in molten state (D) Occurs as solid
- 13 Which of the following are not ionic compounds? (i) MgCl<sub>2</sub> (ii) HCl (iii) CCl<sub>4</sub> (iv) KCl  
 (A) (i) and(ii) (B) (ii) and(iii) (C) (iii) and(iv) (D) (i) and(iii)
- 14 Mention the use of thermite reaction:  
 (A) To make coins (B) To make an alloy  
 (C) For galvanizing (D) To join railway tracks or cracked machine parts
- 15 Prabhakar added zinc granules to copper sulphate solution taken in a test tube. Out of the following, the correct observation (s) made by Prabhakar will be  
 I. Zinc granules have no regular shape.  
 II. Zinc granules have silvery grey colour.  
 III. The colour of zinc granules changed to brownish black.  
 (a) I only  
 (b) II only

(c) III only

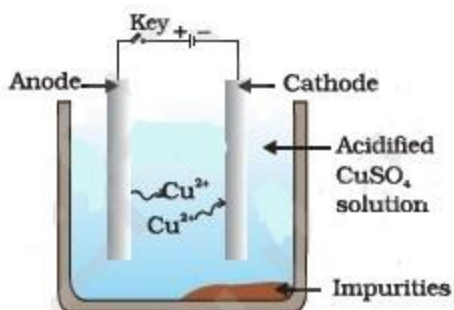
(d) I, II and III

16 Which one of the following figures correctly describes the process of electrolytic refining?

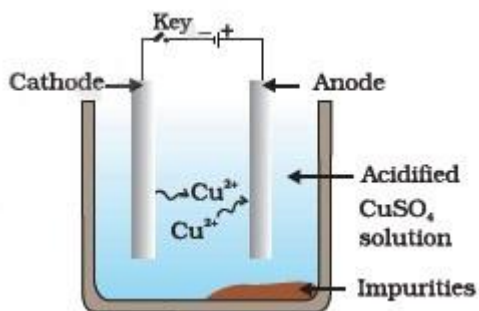
(A)



(B)



(C)



(D)

None of the above

17 An electrolytic cell consists of:

(i) positively charged cathode

(ii) Negatively charged anode

(iii) positively charged anode

(iv) negatively charged cathode

(A) (i) and (ii)

(B) (iii) and (iv)

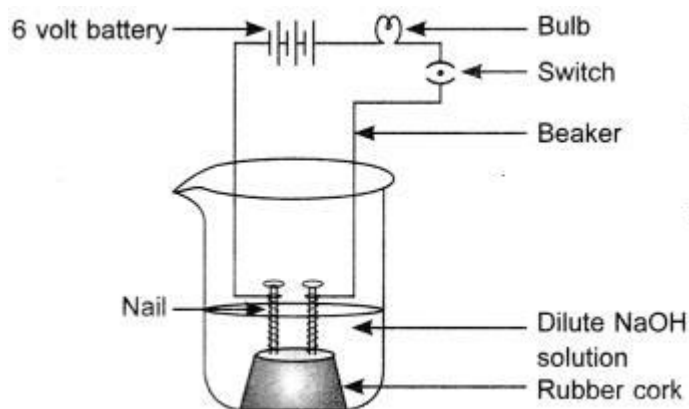
(C) (i) and (iii)

(D) (ii) and (iv)

- 18 Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining?
- (i) Au
  - (ii) Cu
  - (iii) Na
  - (iv) K
- (A) (i) and (ii)            (B) (i) and (iii)            (C) (ii) and (iii)    (D) (iii) and (iv)
- 19 Which of the following is a thermite reaction?
- (A)  $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \rightarrow 6\text{Cu} + \text{SO}_2$
  - (B)  $\text{ZnCO}_3 \rightarrow \text{ZnO} + \text{CO}_2$
  - (C)  $3\text{MnO}_2 + 4\text{Al} \rightarrow 3\text{Mn} + 2\text{Al}_2\text{O}_3$
  - (D)  $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$ .
- 20 Solutions of ferrous sulphate, zinc sulphate, copper sulphate and aluminium sulphate were separately taken in four test tubes and some iron nails were placed in each of the solutions. After few minutes, it would be observed that the colour of
- (A) all the four solutions changed
  - (B) solutions of zinc sulphate, copper sulphate and aluminium sulphate changed and that of ferrous sulphate did not change.
  - (C) solutions of zinc sulphate and aluminium sulphate only changed.
  - (D) only copper sulphate solution changed.
- 21 Thermite reaction:
- (A) is endothermic
  - (B) is highly exothermic
  - (C) produces  $\text{H}_2$  gas
  - (D) needs cooling
- 22 The atomic number of an element Y is 17. The number of electrons in its ion  $\text{Y}^-$  will be:
- (A) 17
  - (B) 18
  - (C) 19
  - (D) 20

- 23 The electronic configurations of three elements X,Y and Z are X- 2,8, Y- 2,8,7 and Z – 2,8,2.  
Which of the following is correct?
- (A) X is a metal
  - (B) Y is a metal
  - (C) Z is a non-metal
  - (D) Y is a non-metal and Z is a metal
- 24 Galvanisation is a method of protecting iron from rusting by coating with a thin layer of
- (A) Gallium
  - (B) Aluminium
  - (C) Zinc
  - (D) Silver
- 25 Silver articles become black on prolonged exposure to air. This is due to the formation of
- (A)  $\text{Ag}_2\text{O}$
  - (B)  $\text{Ag}_2\text{S}$
  - (C)  $\text{AgCN}$
  - (D)  $\text{Ag}_2\text{O}$  and  $\text{Ag}_2\text{S}$
- 26 Objects made of copper lose their lustre and develop a green coating made of
- (A) copper oxide
  - (B) copper hydroxide and copper oxide
  - (C) basic copper carbonate
  - (D) copper carbonate
- 27 Calcination is:
- (A) heating the ore in a limited supply of air
  - (B) heating the ore in excess of air
  - (C) cooling the ore
  - (D) none of these
- 28 X and Y are elements which are highly reactive with air, hence stored in kerosene. What could X and Y be?
- (A) Phosphorous and Sodium
  - (B) Phosphorous and Sodium
  - (C) Sodium and Potassium
  - (D) Sulphur and Potassium
- 29 Metal always found in free state is:
- (A) Gold
  - (B) Silver
  - (C) Copper
  - (D) Sodium
- 30 An element reacts with oxygen to give a compound with a high melting point. This compound is soluble in water. The element is likely to be:
- (A) Calcium
  - (B) Carbon
  - (C) Silicon
  - (D) Iron

- 31 A reactive metal (M) is treated with  $\text{H}_2\text{SO}_4(\text{dil})$ . The gas is evolved and is collected over the



water as shown in the figure.

The correct conclusion drawn is/are:

- (A) The gas is hydrogen (B) The gas is lighter than air  
(B) The gas is  $\text{SO}_2$  and lighter than air (D) Both (A) and (B)

### CASE BASED STUDY

#### CASE STUDY 1

Metals as we know, are very useful in a field, industries in particular. Non-metals are no less in any way. Oxygen present in air is essential for breathing as well as for combustion. Non-metals form a large number of, compounds which are extremely useful, e.g., ammonia, nitric acid, sulphuric acid, etc. Non-metals are found to exist in three states of matter. Only solid non-metals are expected to be hard however, they have low density and are brittle. They usually have low melting and boiling points and are poor conductors of electricity

- 32 The poorest conductor of heat among metals is:  
(A) Mercury (B) Lead (C) Calcium (D) Sodium
- 33 Which property of metals is used for making strings of musical instruments like Sitar and Violin?  
(A) Sonorous (B) Malleability (C) Ductility (D) Conductivity
- 34 Which of the following non-metal is lustrous?  
(A) Sulphur (B) Oxygen (C) Nitrogen (D) Iodine
- 35 An element X is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following  
(A) Mg (B) Na (C) P (D) Ca
- 36 Due to its semiconductor properties the non-metal used in computer, T.V. etc. is:

- (A) Carbon      (B) Bromine      (C) Silicon      (D) Fluorine

#### CASE STUDY 2

Ionic compound is a Chemical compound in which ions are held together by ionic bonds. An ionic bond is the type of chemical bond in which two oppositely charged ions are held through electrostatic forces. We know that, metal atoms have loosely bonded valence electrons in their valence shell and non-metal atoms need electrons in their valence shell to attain noble gas configuration. The metal atom loses the valence electrons while non-metal atom accepts these electrons. By losing electrons, metal atoms change to cations and by accepting electrons, non-metals form anions. Ionic compounds are generally solid and exist in the form of crystal They have high melting and boiling points.

- 37 Reaction between X and Y, forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?
- (A) Has high melting point      (B) Has low melting point      (C) Conducts electricity in molten state      (D) Occurs as solid
- 38 The atomic numbers of four elements A, B, C and D are 6, 8, 10 and 12 respectively. The two elements which can react to form ionic bonds (or ionic compound) are:
- (A) A and D      (B) B and C      (C) A and C      (D) B and D
- 39 Which of the following are ionic compounds? (i) KCl (ii) HCl (iii) CCl<sub>4</sub> (iv) NaCl
- (A) (i) and (ii)      (B) (ii) and (iii)      (C) (i) and (iv)      (D) (i) and (iii)
- 40 The electronic configuration of three elements X, Y and Z are as follows: X = 2, 4, Y = 2, 7, Z = 2, 1. Which two elements will combine to form an ionic compound and write the correct formula:
- (A) X<sub>2</sub>Y      (B) ZY      (C) XZ<sub>3</sub>      (D) Y<sub>2</sub>Z
- 41 The number of protons in an atom of an element A is 19 then, the number of electrons in its ion A<sup>+</sup> is 18. An element is likely to be
- (A) Mg      (B) K      (C) Ca      (D) Na

#### CASE STUDY 3

Metals react with non-metals by losing or gaining electrons. They have a give and take relation between them. Ionic compounds are usually solid and hard in nature. They are generally soluble in water and insoluble in solvents like petrol, kerosene etc. The melting and boiling points of electrovalent compounds are high. In order to change the physical state of the electrovalent

compounds (from solid to liquid to gas), a high temperature is needed to overcome the attractive forces.

- 42 Which of the following properties are not generally exhibited by ionic compounds?  
(A) Electrical conductivity in molten state. (B) Electrical conductivity in solid state.  
(C) High melting and boiling points. (D) Solubility in water.
- 43 Electrovalent compounds are usually solid and hard in nature. This is due to:  
(A) Strong forces of attraction between the oppositely charged ions  
(B) Weak forces of attraction between the oppositely charged ions  
(C) Strong forces of attraction between the same charged ions  
(D) Weak forces of attraction between the similarly charged ions
- 44 Transfer of one or more valence electrons from a metal to non-metal takes place in case of  
(A) Chemical bonding (B) Molecular bonding (C) Ionic bonding (D) Covalent bonding
- 45 Magnesium oxide is formed by transferring electrons from magnesium atoms to oxygen atoms, the magnesium atom has the number of valence electrons as  
(A) Three (B) Four (C) One (D) Two
- 46 The atomic number of four elements A,B,C,D are 4,8,9 and 19 respectively. The two elements which can react to form ionic compounds are  
(A) A and B (B) C and D (C) B and D (D) A and C

#### CASE STUDY 4

During extraction of metals, electrolytic refining is used to obtain pure metals. During the process, the impure metal is made the anode and a thin strip of pure metal is made the cathode. The solution of the metal salt is used as an electrolyte. On passing the current through the electrolyte, the pure metal from the anode dissolves from the electrolyte. An equivalent of pure metal from the electrolyte is deposited on the cathode.

- 47 What is refining of metals?  
(A) The process of purification of the metal obtained after reduction  
(B) Electrolysis of metals  
(C) Heating ore in presence of carbon dioxide  
(D) Putting a coat of metal in order to avoid corrosion
- 48 During electrolytic refining of zinc, it gets  
(A) deposited on cathode

- (B) deposited on anode  
(C) deposited on cathode as well as anode  
(D) remains in the solution
- 49 In electrolytic refining of copper, \_\_\_\_\_ act as impure copper  
(A) anode  
(B) cathode  
(C) both anode and cathode  
(D) none of the above
- 50 In electrolytic refining of copper, \_\_\_\_\_ is a strip of pure copper  
(A) anode  
(B) cathode  
(C) both anode and cathode  
(D) none of the above

#### ASSERTION AND REASONING

Following questions (Q. No 51 to Q. No 58) 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 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.

- 51 **Assertion(A):** Sodium metal is stored under Kerosene.  
**Reason(R):** Metallic sodium melts when exposed to air.
- 52 **Assertion (A):** Hydrogen gas is not evolved when a metal reacts with nitric acid.  
**Reason (R):** Nitric acid is a strong oxidising agent.
- 53 **Assertion (A):** Highly reactive metals are obtained by electrolytic reduction.  
**Reason (R):** In the electrolytic reduction, metal is deposited at the cathode.
- 54 **Assertion (A):** Magnesium chloride is an ionic compound.  
**Reason (R):** Metals and non-metals react by mutual transfer of electrons.
- 55 **Assertion (A) :** Ionic compounds have high melting and boiling points.  
**Reason(R) :** A large amount of energy is required to break the strong inter-ionic attraction in ionic compounds.



- 56 **Assertion (A):** Food cans are coated with tin and not with zinc.  
**Reason (R):** Zinc is more reactive than tin.
- 57 **Assertion (A):** Iron articles get coated with reddish brown powder when left for sometime in the open  
**Reason (R):** Iron is attacked by substances around it such as moisture, acids, etc.
- 58 **Assertion(A):** Silver becomes black in colour when exposed to atmosphere.  
**Reason(R):** Silver reacts with H<sub>2</sub>S gas to form Ag<sub>2</sub>S which is black in colour.
- 59 Sodium reacts with water to form sodium hydroxide and hydrogen gas. The balanced equation which represents the above reaction is  
 (A)  $\text{Na(s)} + 2\text{H}_2\text{O(l)} \rightarrow 2\text{NaOH(aq)} + 2\text{H}_2\text{(g)}$   
 (B)  $2\text{Na(s)} + 2\text{H}_2\text{O(l)} \rightarrow 2\text{NaOH(aq)} + \text{H}_2\text{(g)}$   
 (C)  $2\text{Na(s)} + 2\text{H}_2\text{O(l)} \rightarrow \text{NaOH(aq)} + 2\text{H}_2\text{(g)}$   
 (D)  $2\text{Na(s)} + \text{H}_2\text{O(l)} - 2\text{NaOH(aq)} + 2\text{H}_2\text{(g)}$
- 60 Generally, metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)?  
 (A) H<sub>2</sub>SO<sub>4</sub>    (B) HCl    (C) HNO<sub>3</sub>    (D) All of these

**ANSWERS**

| Q.NO | Ans | Q.NO | Ans | Q.NO | Ans | Q.NO | Ans | Q.NO | Ans | Q.NO | Ans |
|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|
| 1    | D   | 11   | A   | 21   | B   | 31   | A   | 41   | B   | 51   | C   |
| 2    | D   | 12   | B   | 22   | A   | 32   | B   | 42   | B   | 52   | A   |
| 3    | B   | 13   | B   | 23   | D   | 33   | A   | 43   | A   | 53   | A   |
| 4    | D   | 14   | D   | 24   | C   | 34   | D   | 44   | C   | 54   | C   |
| 5    | D   | 15   | D   | 25   | B   | 35   | B   | 45   | D   | 55   | A   |
| 6    | C   | 16   | C   | 26   | C   | 36   | C   | 46   | B   | 56   | A   |
| 7    | D   | 17   | B   | 27   | A   | 37   | B   | 47   | A   | 57   | A   |
| 8    | A   | 18   | A   | 28   | C   | 38   | D   | 48   | A   | 58   | C   |
| 9    | B   | 19   | D   | 29   | A   | 39   | C   | 49   | A   | 59   | B   |
| 10   | B   | 20   | D   | 30   | A   | 40   | B   | 50   | B   | 60   | C   |

\*\*\*\*\*

## 4. CARBON AND ITS COMPOUNDS

1. While cooking, if the bottom of the vessel is getting blackened on the outside, it means that
  - (a) the food is not cooked completely.
  - (b) the fuel is not burning completely.
  - (c) the fuel is wet.
  - (d) the fuel is burning completely.
2. Which of the following statements is correct about a substance that has a giant covalent structure?
  - (a) All its ions are arranged in a giant three-dimensional lattice.
  - (b) A large amount of energy is needed to break down the lattice structure.
  - (c) It conducts electricity in the molten state.
  - (d) It dissolves in water but is more soluble in organic solvents.
3. Which one of the given is an unsaturated hydrocarbon?
  - (a) Acetylene
  - (b) Butane
  - (c) Propane
  - (d) Decane
4. In which of the following compounds, — OH is the functional group?
  - (a) Butanone
  - (b) Butanol
  - (c) Butanoic acid
  - (d) Butanal
5. Oils on treating with hydrogen in the presence of palladium or nickel catalyst form fats. This is an example of
  - (a) Addition reaction

- (b) Substitution reaction
  - (c) Displacement reaction
  - (d) Oxidation reaction
- 6 The odour of acetic acid resembles that of
- (a) Rose
  - (b) Burning Plastic
  - (c) Vinegar
  - (d) Kerosene
7. Ethanol reacts with Na metal to form
- (a)  $\text{CH}_3\text{ONa} + \text{H}_2$
  - (b)  $\text{C}_2\text{H}_5\text{ONa} + \text{H}_2$
  - (c)  $\text{CH}_3\text{COONa} + \text{H}_2$
  - (d)  $\text{CH}_3\text{COOH} + \text{H}_2\text{O}$
8. IUPAC name of first member of homologous series of ketones is
- (a) Ethanone
  - (b) methanone
  - (c) Propanone
  - (d) Butanone
9. Rectified spirit is
- (a) 50% ethanol
  - (b) 80% ethanol
  - (c) 95% ethanol
  - (d) 40 to 50% ethanol
10. Why does carbon form compounds mainly by covalent bonding?

- (a) There are four electrons in the outermost shell of carbon.
  - (b) It requires large amount of energy to form  $C^{4+}$  or  $C^{4-}$
  - (c) It shares its valence electrons to complete its octet.
  - (d) All the above
11. Methane is
- (a) Unsaturated compound
  - (b) nitrogen compound
  - (c) Saturated compound
  - (d) Ionic compound
12.  $C_3H_8$  belongs to the homologous series of
- (a) Alkynes
  - (b) Alkenes
  - (c) Alkanes
  - (d) Cyclo alkanes
13. The isomeric pair is
- (a) Ethane and propane
  - (b) Propane and butane
  - (c) Ethane and ethane
  - (d) Butane and 2-methylpropane
14. The substance not responsible for the hardness of water is
- (a) Sodium nitrate
  - (b) Calcium hydrogen carbonate
  - (c) Calcium carbonate
  - (d) Magnesium carbonate

15. Butanone is a four carbon compound with functional group:
- (a) carboxylic acid
  - (b) alcohol
  - (c) ketone
  - (d) aldehyde
16. Number of free electron(s) in each carbon atom in graphite is/are
- (a) two
  - (b) four
  - (c) one
  - (d) three.
17. 2ml of acetic acid is added to 5ml of water and was shaken up for 1minute, it was noticed that
- (a) The acid formed a separate layer on the top of water
  - (b) Water Formed a separate layer on the top of the acid
  - (c) A clear and homogeneous solution is formed
  - (d) A pink and clear solution is formed
18. Ethane and ethene can be distinguished by using:
- (a) Bromine water
  - (b) Chlorine water
  - (c) I<sub>2</sub>
  - (d) HCl
19. On adding NaHCO<sub>3</sub> to acetic acid a gas is evolved which turns lime water milky due to the formation of
- (a) Calcium Carbonate
  - (b) Calcium Hydroxide

- (c) Calcium bicarbonate
- (d) Calcium Acetate
20. Which of the following represents cyclohexane:
- (a)  $C_6H_{14}$
- (b)  $C_6H_{12}$
- (c)  $C_6H_{10}$
- (d)  $C_6H_6$
21.  $C_{60}$  .give the name of carbon allotrope
- (a) Diamond
- (b) Fullerene
- (c) Graphite
- (d) Proteins
22. Carbon compounds with double or triple bond called.....
- (a) Unsaturated compound
- (b) Carbon compounds
- (c) Saturated compounds
- (d) Ionic compounds
23. Compounds with .....molecular formula with different structures called.....
- (a) Same, structural isomerism
- (b) Different, structural isomerism
- (c) Same, monomeric structures
- (d) Different, monomeric structures
24. Which of the following will undergo addition reactions?
- (a)  $CH_4$

- (b)  $C_3H_8$
- (C)  $C_2H_6$
- (d)  $C_2H_4$
25. Which of the following will give a pleasant smell of ester when heated with ethanol and a small quantity of sulphuric acid?
- (a)  $CH_3COOH$
- (b)  $CH_3CH_2OH$
- (c)  $CH_3OH$
- (d)  $CH_3CHO$
26. Which of the following belongs to homologous series of alkynes?
- $C_6H_6, C_2H_6, C_2H_4, C_3H_4$ .
- (a)  $C_6H_6$
- (b)  $C_2H_4$
- (C)  $C_2H_6$
- (d)  $C_3H_4$
27. A hydrocarbon has four carbon atoms. Give its molecular formula if it is an alkene.
- (a)  $C_4H_{10}$
- (b)  $C_4H_8$
- (C)  $C_4H_6$
- (d)  $C_4H_4$
28. A soap molecule has a
- (a) hydrophobic head and hydrophobic tail
- (b) hydrophobic head and hydrophilic tail
- (c) hydrophilic head and hydrophilic tail
- (d) hydrophilic head and hydrophobic tail

29. The difference in the formula and molecular masses of  $\text{CH}_3\text{OH}$  and  $\text{C}_2\text{H}_5\text{OH}$  is

(a)  $\text{CH}_3$  and 16u

(b)  $\text{CH}_2$  and 14u

(c)  $\text{CH}_4$  and 18u

(d)  $\text{CH}_3$  and 16u

30. Which amongst the following will conduct electricity?

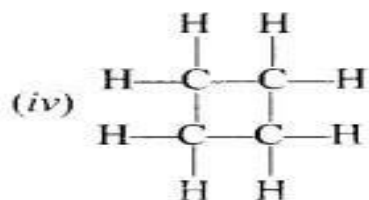
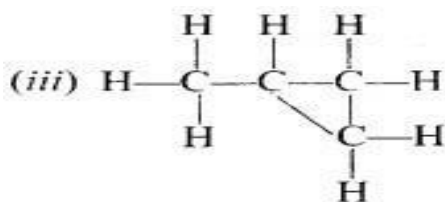
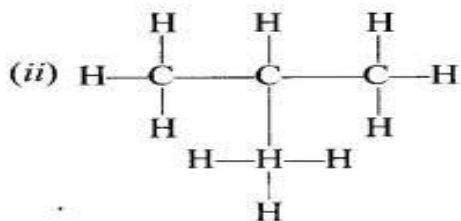
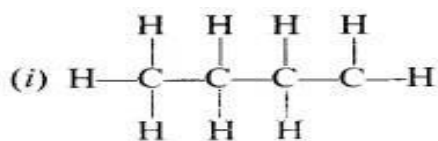
(a)  $\text{C}_6\text{H}_{12}\text{O}_6$

(b)  $\text{KCl(s)}$

(c)  $\text{C}_2\text{H}_5\text{OH}$

(d)  $\text{NaCl (aq)}$

31. Which of the following are correct structural isomers of butane?



(a) (i) and (iii)

(b) (ii) and (iv)



(c) (i) and (ii)

(d) (iii) and (iv)



In the above given reaction, alkaline  $\text{KMnO}_4$  acts as

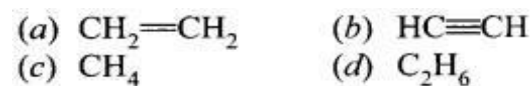
(a) reducing agent

(b) oxidising agent

(c) catalyst

(d) dehydrating agent

33. Ethanol, on heating at 443 K with cone  $\text{H}_2\text{SO}_4$  gives



34. Pentane has the molecular formula  $\text{C}_5\text{H}_{12}$ . It has

A) 5 covalent bonds

B) 12 covalent bonds

C) 16 covalent bonds

D) 17 covalent bonds

35. Acetic acid was added to a solid X kept in a test tube. A colourless, odourless gas Y was evolved. The gas was passed through lime water, which turned milky. It was concluded that

A) solid X is sodium hydroxide and the gas Y is  $\text{CO}_2$

B) solid X is sodium bicarbonate and the gas Y is  $\text{CO}_2$

C) solid X is sodium acetate and the gas Y is  $\text{CO}_2$

D) solid X is sodium bicarbonate and the gas Y is  $\text{SO}_2$

### ASSERTION AND REASONING QUESTIONS

Following questions 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 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.

36. **Assertion (A):** Cooking oil decolourises bromine water.

**Reason (R):** Cooking oil is a saturated compound.

37. **Assertion(A):** If the first member of a homologous series is methanal, its third member will be propanal.

**Reason (R):** All the members of a homologous series show similar chemical properties.

38. **Assertion(A):** Diamond and graphite are allotropes of carbon.

**Reason (R):** Some elements can have several different structural forms while in the same physical state. These forms are called allotropes.

39. **Assertion(A):** Carbon is the only element that can form large number of compounds.

**Reason (R):** Carbon is tetravalent and shows the property of catenation.

40. **Assertion(A):** Soaps are not suitable for washing purpose when water is hard.

**Reason (R):** Soaps have relatively weak cleansing action.

41. **Assertion(A):** Olefins have the general formula  $C_nH_{2n+1}$

**Reason (R):** There is at least one double bond between two carbon atoms in their molecules.

42. **Assertion (A):** In a candle, wax vapours burn in sufficient supply of oxygen, which leads to blue flame.

**Reason (R):** When the oxygen supply is sufficient, then fuels burn completely producing a blue flame.

43. **Assertion(A):** Carbon compounds can form chain, branched and ring structures.

**Reason (R):** Carbon exhibits the property of catenation.

44. **Assertion(A):** In alkanes, alkenes and alkynes the valency of carbon is always four.

- Reason (R):** All hydrocarbons except alkanes contain double bonds.
45. **Assertion (A):** Carbon monoxide is extremely poisonous in nature.  
**Reason (R):** Carbon monoxide is formed by complete combustion of carbon.
46. **Assertion (A):** Alkanes give addition reaction.  
**Reason (R):** Addition reactions are a characteristic property of unsaturated hydrocarbons.
47. **Assertion(A):** n-butane and iso-butane are examples of isomers.  
**Reason (R):** Isomerism is possible only with hydrocarbons having 4 or more carbon atoms.
48. **Assertion(A):** Diamond and graphite do not have the same crystal structure.  
**Reason (R):** Diamond is crystalline while graphite is amorphous.
49. **Assertion(A):** The functional group present in alcohols is – OH.  
**Reason (R):** It is the same group as present in water, hence water and alcohol have similar properties.
50. **Assertion(A):** Graphite is soft and slippery to touch.  
**Reason (R):** Graphite has sheet like layered structure.
51. **Assertion(A):** Graphite is a good conductor of electricity.  
**Reason (R):** It has one free valence electron.
52. **Assertion(A):** Saturated hydrocarbons are chemically less reactive.  
**Reason (R):** All the valencies of carbon atom are satisfied by single covalent bonds.
53. **Assertion(A):** Ethanol is first member of the alcohol homologous series.  
**Reason (R):** A homologous series can be represented by a general formula.
54. **Assertion(A):** Diamond is the hardest natural known substance.  
**Reason (R):** Diamond is used for cutting marble, granite and glass.
55. **Assertion(A):** Carbon and its compounds can be used as fuels.  
**Reason (R):** They are highly inflammable and have high calorific value.
56. **Assertion(A):** Covalent compounds are generally poor conductor of electricity.  
**Reason (R):** They consist of molecules and not ions which can transfer charge.

57. **Assertion(A):** Diamond is not good conductor of electricity.  
**Reason(R):** It has no free electrons.
58. **Assertion(A):** Carbon possesses property of catenation.  
**Reason (R):** Carbon atoms form double as well as triple bonds during catenation.
59. **Assertion(A):** Both aldehydes and ketones contain carbonyl group.  
**Reason (R):** In aldehydes, the functional group is attached to at least one hydrogen atom.
60. **Assertion(A):** Two members of a homologous series have similar chemical properties.  
**Reason (R):** Propane and butane are members of same homologous series.

### CASE BASED QUESTIONS

#### CASE STUDY 1

The compounds which have the same molecular formula but differ from each other in physical or chemical properties are called isomers and the phenomenon is called isomerism. When the isomerism is due to difference in the arrangement of atoms within the molecule, without any reference to space, the phenomenon is called structural isomerism. In other words, structural isomers are compounds that have the same molecular formula but different structural formulas, i.e., they are different in the order in which different atoms are linked. In these compounds, carbon atoms can be linked together in the form of straight chains, branched chains or even rings.

61. Which of the following sets of compounds have same molecular formula?  
(a) Butane and iso-butane  
(b) Cyclohexane and hexene  
(c) Propanal and propanone  
(d) All of these
62. In order to form branching, an organic compound must have a minimum of  
(a) four carbon atoms  
(b) three carbon atoms  
(c) five carbon atoms  
(d) any number of carbon atoms.
63. Which of the following is an isomeric pair?  
(a) Ethane and propane  
(b) Ethane and ethene  
(c) Propane and butane  
(d) Butane and 2-methylpropane
64. Among the following the one having longest chain is  
(a) neo-pentane  
(b) iso-pentane  
(c) 2-methylpentane  
(d) 2,2-dimethylbutane.

65. The number of isomers of pentane is
- (a) 2
  - (b) 3
  - (c) 4
  - (d) 5

#### CASE STUDY 2

Food, clothes, medicines, books, or many of the things are all based on this versatile element carbon. In addition, all living structures are carbon based. The earth's crust has only 0.02% carbon in the form of minerals. The element carbon occurs in different forms in nature with widely varying physical properties. Both diamond and graphite are formed by carbon atoms, the difference lies in the manner in which the carbon atoms are bonded to one another. Carbon has the unique ability to form bonds with other atoms of carbon, giving rise to large molecules. This property is called catenation.

66. From the given alternatives, whose chemical and physical properties are not same?
- (a) Graphite and Diamond
  - (b) Phosphorous and Sulphur
  - (c) Carbon and Hydrogen
  - (d) Methyl alcohol and Acetic acid
67. Which of the following statements is not correct?
- (a) Graphite is much less dense than diamond
  - (b) Graphite is black and soft
  - (c) Graphite has low melting point
  - (d) Graphite feels smooth and slippery
68. Which of the following are isomers?
- (a) Butane and isobutene
  - (b) Ethane and ethene
  - (c) Propane and propyne
  - (d) Butane and isobutane
69. Which one of the following is not an allotrope of carbon?
- (a) Soot
  - (b) Graphite
  - (c) Diamond
  - (d) Carborundum
70. Pentane has the molecular formula  $C_5H_{12}$ . It has
- (a) 5 covalent bonds
  - (b) 12 covalent bonds
  - (c) 16 covalent bonds
  - (d) 17 covalent bonds

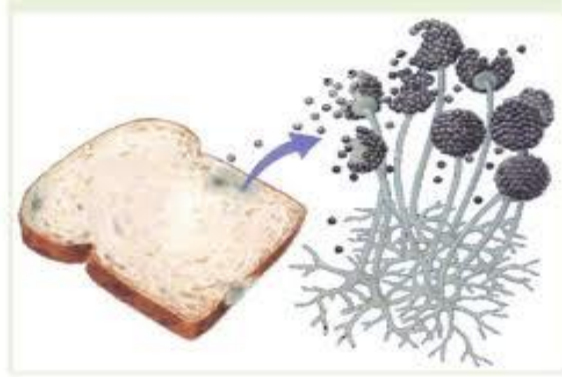
## ANSWERS

| Q No | Ans | Q No | Ans | Q No | Ans | Q No | Ans |
|------|-----|------|-----|------|-----|------|-----|
| 1    | b   | 21   | b   | 41   | d   | 61   | d   |
| 2    | b   | 22   | a   | 42   | a   | 62   | a   |
| 3    | a   | 23   | a   | 43   | a   | 63   | d   |
| 4    | b   | 24   | d   | 44   | c   | 64   | c   |
| 5    | a   | 25   | a   | 45   | c   | 65   | b   |
| 6    | c   | 26   | d   | 46   | d   | 66   | d   |
| 7    | b   | 27   | b   | 47   | b   | 67   | c   |
| 8    | c   | 28   | d   | 48   | c   | 68   | d   |
| 9    | c   | 29   | b   | 49   | c   | 69   | d   |
| 10   | d   | 30   | a   | 50   | a   | 70   | c   |
| 11   | c   | 31   | c   | 51   | a   |      |     |
| 12   | c   | 32   | b   | 52   | a   |      |     |
| 13   | d   | 33   | a   | 53   | d   |      |     |
| 14   | a   | 34   | c   | 54   | b   |      |     |
| 15   | c   | 35   | b   | 55   | a   |      |     |
| 16   | c   | 36   | b   | 56   | a   |      |     |
| 17   | c   | 37   | b   | 57   | a   |      |     |
| 18   | a   | 38   | a   | 58   | b   |      |     |
| 19   | a   | 39   | d   | 59   | b   |      |     |
| 20   | b   | 40   | b   | 60   | b   |      |     |

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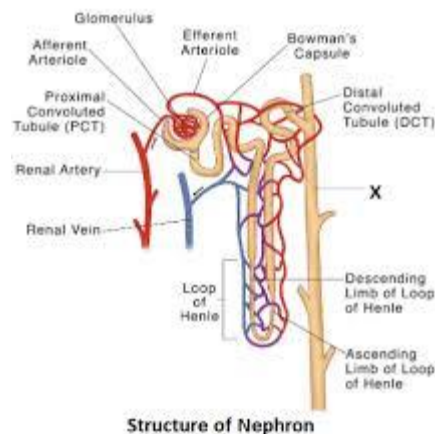
## 5. LIFE PROCESSES

- 1 Identify the type of nutrition exhibited by the given figure.



- (a) Autotrophic nutrition                      (b) Saprophytic nutrition  
(c) Parasitic nutrition                        (d) Symbiotic nutrition
- 2 In which of the following groups of organisms, food material is broken down outside the body and absorbed?
- (a) Bread moulds, Yeast and Mushrooms  
(b) Mushroom, green plants, Amoeba  
(c) Cuscuta, lice, tapeworm  
(d) Paramecium, Amoeba, Cuscuta
- 3 Vijay was playing in the ground with his friends. While running he had a wound on his leg. His blood was not getting clotted and there was excessive blood loss. Name the blood cells, whose reduction in number can cause clotting disorder, leading to excessive loss of blood from the body.
- (a) Platelets   (b) Red-blood cell   (c) White-blood cells   (d) none of these
- 4 The lining of alimentary canal has muscles that contract rhythmically in order to push the food forward. This movement is called:
- (a) Translocation  
(b) Transpiration  
(c) Peristaltic movement  
(d) Digestion
- 5 The opening and closing of the stomatal pore depend upon:
- (a) Oxygen      (b) Temperature      (c) Water in the guard cells   (d) Concentration of CO<sub>2</sub>

- 6 When a few drops of iodine solution are added to rice water, the solution turns blue- black in colour. This indicates that rice water contains:
- fats
  - complex proteins
  - starch
  - simple proteins
- 7 Which part of nephron allows the selective reabsorption of useful substances like glucose, amino acids, salts and water into the blood capillaries?
- Tubule
  - Glomerulus
  - Bowman's capsule
  - Ureter
- 8 The procedure used for cleaning the blood of a person by removing nitrogenous waste from it is called:
- osmosis
  - filtration
  - dialysis
  - double circulation
- 9 The diagram given below shows the structure of a nephron.



Nephron is a unit of filtration in kidneys that filters waste material. It excretes or reabsorbs water with the help of capillaries that surround it. What is the use of this excretion or reabsorption of water?

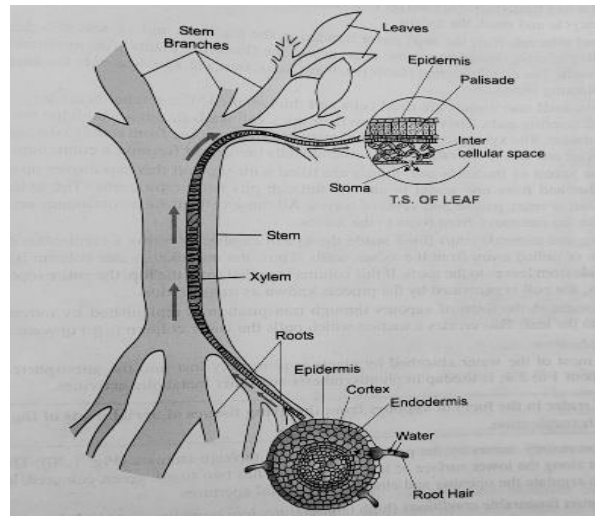
- It helps to uptake and store excess amount of water in the body for later use.
- It helps to keep the output of urine constant throughout the day.
- It maintains the concentration of urine based on the amount of water present in the body.
- It makes the process of filtration at Bowman's capsule easier.



10 Raw materials required in the autotrophic mode of nutrition involves:

- (i) Chlorophyll
  - (ii) Carbon dioxide and water
  - (iii) Nitrogen
  - (iv) Sunlight
- (a) (i), (ii) and (iii)  
(b) (i), (ii) and (iv)  
(c) (i) and (ii)  
(d) All (i), (ii), (iii) and (iv)

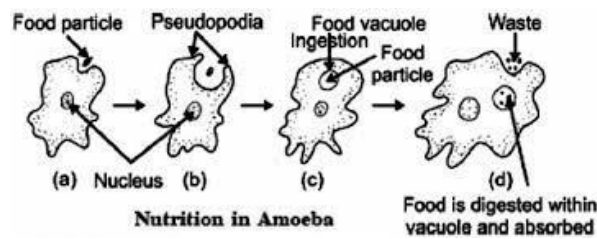
11 The diagram given below shows the transport of water and minerals in plants with the help of xylem:



How is water and minerals transported from xylem to the tissues according to plant needs:

- (a) Water is transported in only one direction in plant.
- (b) Minerals are also transported along with the water in plants body.
- (c) Water is transported from a region with low concentration to higher concentration.
- (d) Water transported from a region with higher concentration to lower concentration.

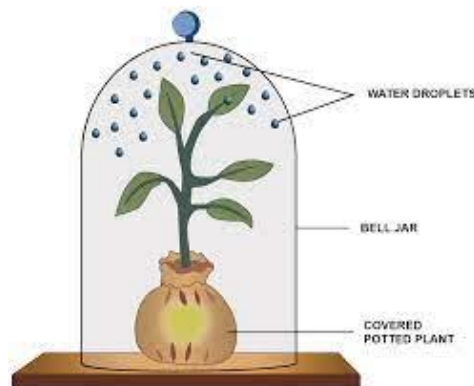
12 The figure given below shows how nutrition in amoeba takes place:



What is the advantage of this process of nutrition in amoeba:

- (a) More amount of food can be consumed.
- (b) Complex food can be digested easily.

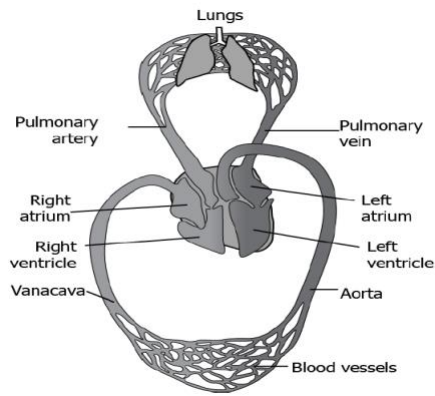
- (c) Capturing food takes less time.
- (d) Fast distribution of nutrition within the body.
- 13 Identify the correct path of air passage in respiration in humans:
- (a) Nasal cavity – pharynx – larynx – trachea – bronchi – bronchioles
- (b) larynx – nasal cavity – pharynx – trachea
- (c) pharynx – nasal cavity – larynx – trachea – bronchi – bronchioles
- (d) larynx – pharynx – trachea – lungs
- 14 Which of the following statements is the correct definition of arteries?
- (a) They have thin walls with valves inside, blood flows under low pressure and carry from the heart to various organs of the body
- (b) They have thick elastic walls, blood flows under high pressure; collect blood from different organs and bring it back to the heart.
- (c) They have thick elastic walls without valves inside, blood flows under high pressure and carry blood away from the heart to different parts of the body
- (d) They have thick elastic walls, blood flows under low pressure; carry blood from the heart to various organs of the body
- 15 Sumana setup an experiment using a well-watered plant. The plant roots and soil were covered with a rubber sheet. The plant was then kept in a glass bell jar and sealed with Vaseline at the bottom part to prevent the flow of air. Sumana kept the apparatus in the light and observed water drops inside the jar after 2 hours as shown in the image.



What observations can be made from this experiment?

- (a) Plant leaves give off water in the form of vapours
- (b) Heat from the outside warms the jar which melts the Vaseline into vapours
- (c) Plant absorbs water from environment thus extra water appears on the inside jar

- (d) Covered roots and stem of the plant decreases the temperature of jar resulting in condensation of moisture into vapours.
- 16 Smoking is likely to cause infections in the respiratory tract. Which statement best explains the fact?
- (a) Smoking makes the hair-like structures wet and they fail to trap dust particles
  - (b) Smoking destroys the nasal cavity
  - (c) Smoking stimulates the hair-like structures to release harmful chemicals
  - (d) Smoking causes less growth of the hair-like structures
- 17 During contraction, what prevents the backflow of blood inside the heart?
- a. Valves in heart
  - b. Thick muscular walls of ventricles
  - c. Thin walls of atria
  - d. All of the above
- 18 Name the substances whose build up in the muscles during vigorous physical exercise may cause cramps?
- (a) Ethanol + Carbon dioxide
  - (b) Lactic acid
  - (c) Carbon dioxide + Water
  - (d) Pyruvate
- 19 The characteristic processes observed in anaerobic respiration are:
- i) Presence of oxygen
  - ii) Release of carbon dioxide
  - iii) Release of energy
  - iv) Release of lactic acid
- (a) i), ii) only
  - (b) i), ii), iii) only
  - (c) ii), iii), iv) only
  - (d) iv) only
- 20 The image shows the transport of gases in the body through the heart and lungs.



Which of the following option shows the transport of oxygen to the cell correctly?

- (a) Lungs → pulmonary vein → left atrium → left ventricle → aorta → body cells
- (b) Lungs → pulmonary vein → right atrium → right ventricle → aorta → body cells
- (c) Lungs → pulmonary artery → left atrium → left ventricle → vena cava → body cells
- (d) Lungs → pulmonary artery → right atrium → right ventricle → vena cava → body cells

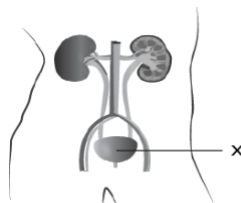
21 Pick the correct one from the following:

- a. Plasma = Blood – Lymphocytes
- b. Lymph = Plasma + RBC + WBC
- c. Serum = Plasma+ WBC
- d. Blood = Plasma + RBC + WBC+ Platelets

22 Which is the correct sequence of body parts in the human alimentary canal?

- (a) Mouth → stomach → small intestine → large intestine → oesophagus
- (b) Mouth → oesophagus → stomach → small intestine → large intestine
- (c) Mouth → stomach → oesophagus → small intestine → large intestine
- (d) Mouth → oesophagus → stomach → large intestine → small intestine

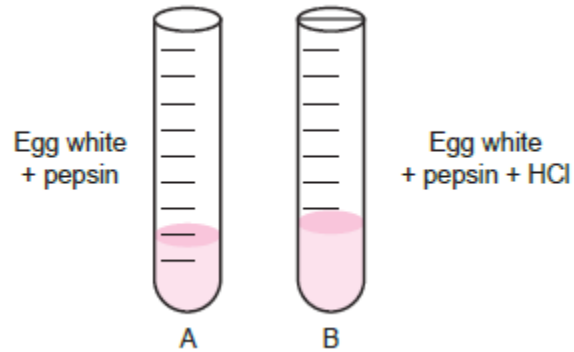
23 The image shows the excretory system in humans.



What is the importance of the labelled part in the excretory system?

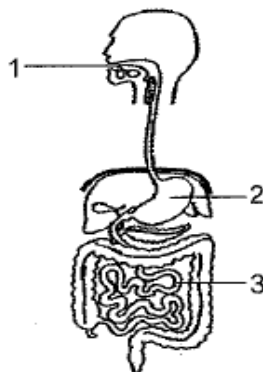
- (a) It produces urine.
- (b) It filters waste from the blood.
- (c) It stores the urine till urination.
- (d) It carries urine from the kidney to the outside.

- 24 If salivary amylase is lacking in the saliva, which of the following events in the mouth cavity will be affected?
- Proteins breaking down into amino acids
  - Starch breaking down into sugars
  - Fats breaking down into fatty acids and glycerol
  - Absorption of vitamins
- 25 Gopi sets up an experiment to study the role of enzymes in digestion of food.



In which test tube, the digestion of protein will occur?

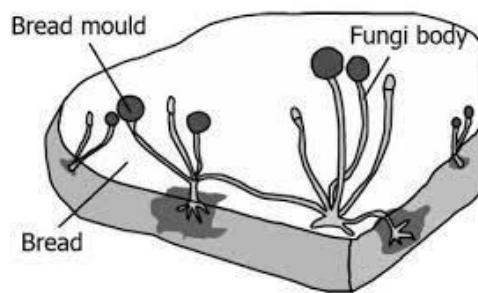
- Test tubes A as pepsin will breakdown protein into simple molecules.
  - Test tube B as HCl will breakdown protein into simple molecules.
  - Test tube A as pepsin will breakdown into simple molecules.
  - Test tube B as HCl will activate pepsin for breakdown of protein into simple molecules.
- 26 Identify the correct path of urine in the human body.
- Kidney → urinary bladder → urethra → ureter
  - Urinary bladder → ureter → kidney → urethra
  - Kidney → ureter → urethra → urinary bladder
  - Kidney → ureter → urinary bladder → urethra
- 27 Identify the option that indicates the correct enzyme that is secreted in location 1,2,3.



- (a). 1. lipase    2. trypsin    3. pepsin
- (b) 1. amylase    2. pepsin    3. trypsin
- (c) 1. trypsin    2. amylase    3. pepsin
- (d) 1. pepsin    2. trypsin    3. lipase

28 The diagram given below shows the bread moulds on a bread. What do you think is the mode of nutrition in fungi?

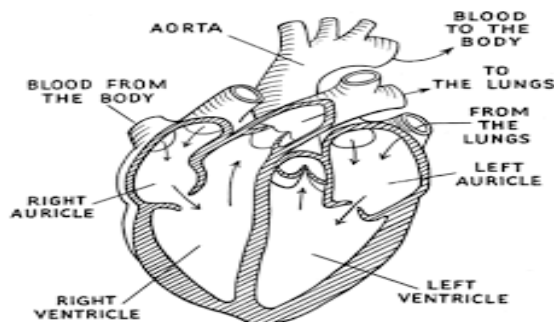
- (a) By using nutrients from the bread to prepare their own food.
- (b) By allowing other organisms to grow on the bread and then consuming them.
- (c) By breaking down the nutrients of bread and then absorbing them.
- (d) By eating the bread on which it is growing.



29 Pancreas secretes trypsin enzyme. Mr. Prakash is suffering from malfunctioning of the pancreas. Which of the following will be adversely affected in Mr. Prakash's body?

- (a) Digestion of carbohydrates                      (b) Digestion of proteins
- (c) Digestion of fats                                      (d) Digestion of vitamins

30 The figure given below shows oxygenated and de-oxygenated blood in the human heart.



What is the direction of deoxygenated blood from right ventricle of the heart?

- (a) towards the lungs.
- (b) towards the left atrium of heart.

(c) towards the upper body.

(d) towards the lower body.

31 Which of the following events in the mouth cavity will be affected if salivary amylase is lacking in the saliva?

(a) Starch breaking down into sugars.

(b) Proteins breaking down into amino acids.

(c) Absorption of minerals

(d) Fats breaking down into fatty acids and glycerol

#### CASE BASED QUESTIONS.

Read the paragraph given below and answer the questions: (Q.No. 32 to Q.No 36)

Manik experienced muscular cramps during the training session for his upcoming football match. Mr.Prasad Sen, his coach advised him on a schedule of some aerobic exercises to overcome his problem of muscular cramps. Manik followed his coach's advice and did not face the problem of muscular cramps again during his match.

32 Which life process is depicted by the above passage?

(a) Respiration

(b) Digestion

(c) Nutrition

(d) Excretion

33 Lack of oxygen in muscles often leads to cramps due to

(a) Conversion of pyruvate to ethanol

(b) Conversion of glucose to pyruvate

(c) Conversion of pyruvate to glucose

(d) Conversion of pyruvate to lactic acid

34 Lactic acid is produced by \_\_\_\_\_ respiration in yeast.

(a) aerobic

(b) anaerobic

(c) oxidative

(d) none of these

35 Why there is an increase in lactic acid concentration in the blood at the beginning of the exercise?

(a) Lack of oxygen

- (b) Excess of oxygen
- (c) Lack of carbon dioxide
- (d) Excess of carbon dioxide

36 What else can be done for quick relief from muscular cramps?

- (a) Massage
- (b) by applying heating pad or an ice pack
- (c) pain killers
- (d) all of these

Read the paragraph given below and answer the questions: (Q.No. 37 to Q.No 40)

Arteries are the vessels which carry blood away from the heart to various organs of the body. Since the blood emerges from the heart under high pressure, the arteries have thick, elastic walls. Veins collect the blood from different organs and bring it back to the heart. They do not need thick walls because the blood is no longer under pressure, instead they have valves that ensure that the blood flows only in one direction. On reaching an organ or tissue, the artery divides into smaller and smaller vessels to bring the blood in contact with all the individual cells. The smallest vessels have walls which are one-cell thick and are called capillaries. Exchange of material between the blood and surrounding cells takes place across this thin wall. The capillaries then join together to form veins that convey the blood away from the organ or tissue.

37 What is the importance of thin walls of blood capillaries?

- (a) Thin walls of blood capillaries provide them protection
- (b) Exchange of materials between the blood and surrounding cells take place across the thin walls of blood capillaries
- (c) Thin walls of blood capillaries help on smooth flow of blood
- (d) All of the above

38 What is the function of valves in veins?

- (a) Valves ensure the unidirectional flow of blood
- (b) Valves increase the oxygen carrying capacity of the blood



- (c) Valves protect the veins from outer shocks
- (d) Valves withstand the high pressure of blood in veins

39 Which blood vessels have high blood pressure and what they have to withstand this high pressure?

- (a) Both arteries and veins have same pressure of blood and they are thick - walled vessels
- (b) Arteries have high blood pressure and they have elastic and thick walls to withstand this high pressure
- (c) Veins have high blood pressure and they have to valves to withstand this high pressure
- (d) None of the above

What is the function of arteries?

- 40
- (a) Arteries have high blood pressure
  - (b) Arteries are present in the body of human beings
  - (c) Arteries are thicker than veins
  - (d) Arteries are the blood vessels which carry blood away from the heart to various organs of the body

Read the following passage and answer questions from 41 to 45.

Oxygen-rich blood from the lungs comes to the thin-walled upper chamber of the heart on the left. The left upper chamber (A) then relaxes. It then contracts and the blood is allowed to enter the next chamber (B), as it expands. When the muscular left lower chamber of heart contracts the blood is pumped out to the body via aorta. Deoxygenated blood reaches from the body to the upper chamber on the right side of heart (C) and it expands. As this part contracts, the corresponding lower chamber (D) dilates. This transfers the blood to right ventricle, which int pumps it to the lungs for oxygenation.

- 41 In the human body, the blood enters the aorta of the circulatory system from the
- (a) Chamber A (b) Chamber B (c) Chamber C (d) Chamber D
- 42 Name the chamber marked as 'C' and whether it will receive oxygenated blood or deoxygenated blood.
- (a) Right atrium, deoxygenated blood. (b) Right atrium, oxygenated blood.
  - (c) Right ventricle, deoxygenated blood. (d) Right ventricle, oxygenated blood.
- 43 Name the chamber marked as 'B'.
- (a) Right atrium (b) Left atrium (c) Right ventricle (d) Left ventricle
- 44 Name the blood vessel that brings blood to chamber 'A'
- (a) Pulmonary artery (b) Pulmonary vein (c) Vena cava (d) Aorta
- 45 What is the correct route of blood in human heart?
- (a) A → B → D → C → Lungs (b) A → B → Lungs → C → D
  - (c) C → D → B → A → Lungs (d) C → D → Lungs → A → B

## ASSERTION AND REASONING

Q. no 46 to 50 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

- 46 Assertion(A): The main organ of human excretory system is kidney.  
Reason(R): Kidneys remove excess water and nitrogenous wastes from the body.
- 47 Assertion (A): Alveoli contain an extensive network of blood vessels.  
Reason (R): Alveoli is the site where exchange of gases occurs
- 48 Assertion: Liver is known as the smallest gland of the body.  
Reason: It secretes bile juice.
- 49 Assertion (A): Excretory unit of kidneys is nephron.  
Reason (R): It has no role in secretion of urine.
- 50 Assertion (A): Aerobic respiration releases less energy than anaerobic respiration  
Reason (R): Mitochondria is powerhouse of a cell

### ANSWERS

| Q.no | Ans | Q.no | Ans | Q.no | Ans | Q.no | Ans | Q.NO | Ans |
|------|-----|------|-----|------|-----|------|-----|------|-----|
| 1    | b   | 11   | d   | 21   | d   | 31   | a   | 41   | b   |
| 2    | a   | 12   | d   | 22   | b   | 32   | a   | 42   | c   |
| 3    | a   | 13   | a   | 23   | c   | 33   | d   | 43   | d   |
| 4    | c   | 14   | c   | 24   | b   | 34   | b   | 44   | b   |
| 5    | c   | 15   | a   | 25   | d   | 35   | a   | 45   | d   |
| 6    | c   | 16   | a   | 26   | d   | 36   | d   | 46   | a   |
| 7    | a   | 17   | a   | 27   | b   | 37   | b   | 47   | a   |
| 8    | c   | 18   | b   | 28   | c   | 38   | a   | 48   | d   |
| 9    | c   | 19   | c   | 29   | b   | 39   | b   | 49   | c   |
| 10   | b   | 20   | a   | 30   | a   | 40   | d   | 50   | d   |

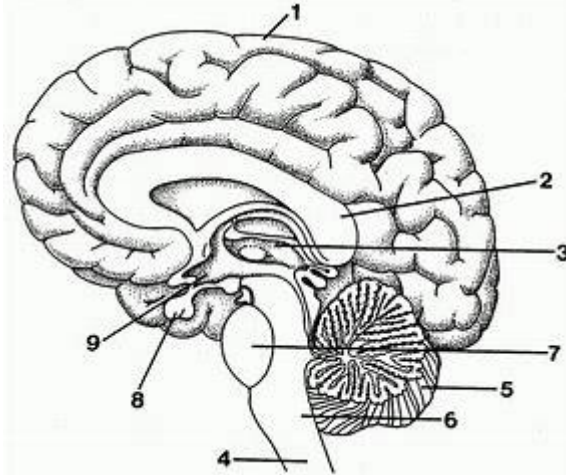
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## 6. CONTROL AND COORDINATION

1. Reflex actions are mediated through
  - a. Brain
  - b. Effectors
  - c. Spinal cord
  - d. Receptors
2. The functional gap between n two neurons is \_\_\_\_\_.
  - a. Neuromuscular junction
  - b. Synapse
  - c. Node of ranvier
  - d. axon
3. Central nervous system includes \_\_\_\_\_.
  - a. Brain only
  - b. spinal cord only
  - c. Brain and spinal cord
  - d. Brain ,spinal cord and nerves
4. Which of the following statements are true about the brain?
  - i. The main thinking part of the brain is the hind brain.
  - ii. Centres of hearing , smell memory, sight etc ,are located in the forebrain.
  - iii. involuntary actions like salivation, vomiting and blood pressure are controlled by the medulla in the hind brain.
  - iv. Cerebellum does not control posture and balance of the body.
    - a. (i) and (II)
    - b. (i) , (II), and (iii)
    - c. (ii) and (iii)
    - d. (iii) and (iv)
5. The growth of tendrils in pea plant is due to
  - a. Effect of light
  - b. Effect of gravity
  - c. Rapid cell division in tendrillar cells that are away from the support
  - d. Rapid cell divisions in tendrillar cells in contact with the support.
6. Select the mismatched pair
  - a. Adrenaline: pituitary gland
  - b. Testosterone: testis
  - c. Estrogen: ovary
  - d. Thyroxine: Thyroid Gland
7. Which is the correct sequence of the components of a reflex arc?
  - a. Receptors-Muscles-sensory neuron-motor neuron-spinal cord
  - b. Receptors-motor neuron-spinal cord-sensory neuron-muscles
  - c. Receptors-spinal cord-sensory neuron-motor neuron-Muscles
  - d. Receptors-sensory neuron-spinal cord – motor neuron-Muscles
8. Which of the following acts as both exocrine and endocrine gland?
  - a. Liver
  - b. Pancreas
  - c. Ovary
  - d. testis
9. Which of the following is an example of a reflex action?
  - a. A knee jerk

- b. Blinking of an eye
- c. Pumping of blood by the heart
- d. Both (a) and (b)

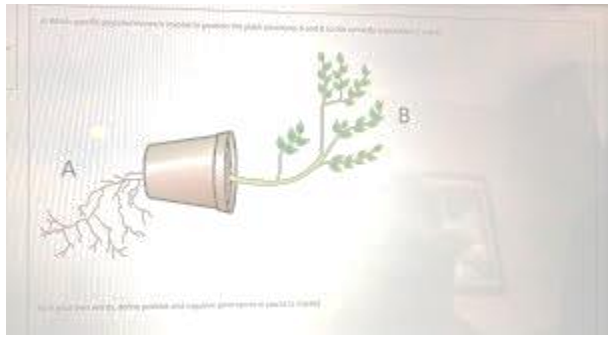
10.



Ali lost his vision in an accident. Which of the following labelled parts injury cause the loss of Ali's vision?

- a. 2
  - b. 4
  - c. 2
  - d. 1
- 11 Which part of the brain controls the release of hormones
- a. 9
  - b. 8
  - c. 6
  - d. 4
- 12 Response of plant roots towards water is called:
- (a) Chemotropism
  - (b) Phototropism
  - (c) Hydrotropism
  - (d) Geotropism
13. Fall of mature leaves and fruits from plants is triggered by which of the following substance?
- (a) Auxin
  - (b) Cytokinin
  - (c) Gibberellin
  - (d) Absciscic acid
14. Identify which of the following statements about thyroxin is incorrect?
- (a) Thyroid gland requires iodine to synthesize thyroxin.
  - (b) Thyroxin is also called thyroid hormone.
  - (c) It regulates protein, carbohydrates and fat metabolism in the body.
  - (d) Iron is essential for the synthesis of thyroxin.
15. The growth of pollen tube towards ovules is due to
- a. Hydrotropism                      b. Chemotropism
  - b. Geotropism                        d. Phototropism

16.



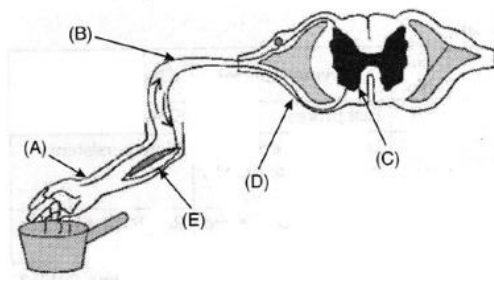
In the given figure part B exhibits

- a. Positive geotropism
- b. Negative geotropism
- b. Positive chemotropism
- d. Negative hydrotropism

17. The plant hormone which is essential for cell elongation
- a. Ethylene
  - b. Auxin
  - c. Gibberellin
  - d. Cytokinin
18. The shape of guard cells changes due to change in the
- a. protein composition of cells
  - b. temperature of cells
  - c. amount of water in cells
  - d. position of nucleus in the cells
19. A response is \_\_\_\_\_
- a. A change in the environment that causes a reaction
  - b. Something you write on a test
  - c. A reaction to a change in the environment
  - d. The way plants communicate
20. Which nerves transmit impulses from the central nervous system towards muscle cells?
- a. Sensory nerves
  - b. Motor nerves
  - c. Relay nerves
  - d. Cranial nerves
21. Involuntary actions in the body are controlled by
- a. medulla in forebrain
  - b. medulla in midbrain
  - c. medulla in hindbrain
  - d. medulla in the spinal cord
22. Non-directional plant movements are called:
- a. Nastic movements
  - b. Tropic movements
  - c. Cyclosis
  - d. Tactic movements

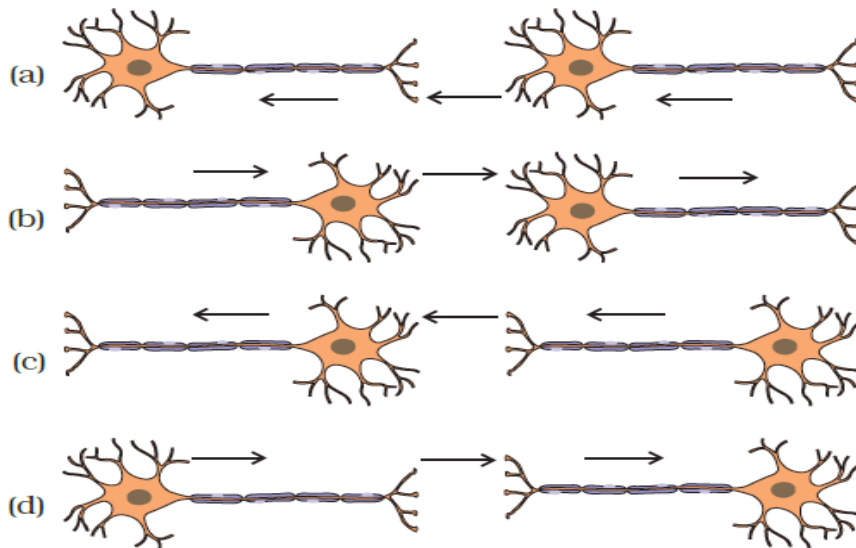
- 23 Organisms depend on hormones as well as electric impulses for the transmission of signals from the brain to the rest of the body. What can be a likely advantage of hormones over electric impulses?
- It is secreted by all types of cells present in the body.
  - It is secreted by stimulated cells and reaches all cells of the body.
  - It is relayed to the target organ faster than electric impulses.
  - It does not depend on an external stimulus to be generated in the cells.
- 24 Choose the incorrect statement about Insulin
- It is produced from pancreas
  - .It regulates growth and development of the body.
  - It regulates blood sugar levels.
  - Insufficient secretion of Insulin will cause diabetes.
- 25 The hormone which increases fertility in males is called
- oestrogen
  - testosterone
  - Insulin
  - Growth hormone

26



- The correct labelling for the given diagram A ,B ,C,D and E are
- Receptors, sensory neuron, relay neuron, motor neuron , effector
  - Effector, sensory neuron, motor neuron , receptors, relay neuron
  - Relay neuron, receptors, motor neuron, sensory neuron , effector
  - effector, motor neuron , relay neuron, sensory neuron, and receptor

- 27 Which of the following is not caused by a growth movement?
- bending of the shoot of a plant in response to light
  - closing up of leaves of a sensitive plant on touching with an object
  - climbing up of a plant on an object by using tendrils
  - movement of the root of a plant towards a source of water
- 28 Which of the following hormone prepares our body for action in emergency situations?
- testosterone
  - growth hormone
  - adrenaline
  - insulin



**Fig. 7.1**

What is the correct direction of the flow of electrical impulses?

- 30 The nature of nerve impulse is
- Chemical
  - Electrochemical
  - Magnetic
  - Electromagnetic

#### ASSERTION / REASONING

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

- Both A and R are true and R is the correct explanation of A.
  - Both A and R are true but R is not the correct explanation of A.
  - A is true but R is false.
  - A is false but R is true.
- 31 Assertion(A): Plants convey the acquired information from cell to cell.  
Reason ( R ): Plants have specialised tissues for conduction of information
- 32 Assertion (A):A growing plant appears to bend towards the direction of light.  
Reason (R) :The plant hormone auxin diffuses towards the shady side of the shoot.
- 33 Assertion (A): Adrenaline crosses reduced supply of oxygen to our muscles.  
Reason (R) : Under the influence of adrenalin the heart beats faster.
- 34 Assertion(A): Insulin regulates blood sugar level.  
Reason(R) : Insufficient secretions of insulin will cause diabetes.
- 35 Assertion (A) : Reflex arcs have evolved in animals.  
Reason ( R ): The thinking process of brain is not fast enough
- 36 Assertion (A) : The brain is also known as the central nervous system.  
Reason (R) : Central nervous system controls and regulates the voluntary actions.
- 37 Assertion(A) : The use of iodised salt prevents risk of goitre.  
Reason (R) : Iodised salt provides iodine needed by thyroid gland to make sufficient thyroxin for our body.
- 38 Assertion (A) : The effect of auxin hormone on the growth of root is exactly opposite to that on a stem.

Reason (R) : Auxin hormone increases the rate of growth in root and decreases the rate of growth in stem.

39 Assertion(A): A growing plant appears to be moving.

Reason (R): The growth in plants is non directional.

40. Assertion (A): Deficiency of growth hormone leads to Dwarfism.

Reason ( R): Growth hormone is secreted by Pituitary gland.

### ANSWERS

| Q.no | Ans | Q.no | Ans | Q.no | Ans | Q.no | Ans |
|------|-----|------|-----|------|-----|------|-----|
| 1    | C   | 11   | B   | 21   | C   | 31   | C   |
| 2    | B   | 12   | C   | 22   | A   | 32   | A   |
| 3    | C   | 13   | D   | 23   | B   | 33   | D   |
| 4    | C   | 14   | D   | 24   | B   | 34   | A   |
| 5    | C   | 15   | B   | 25   | B   | 35   | A   |
| 6    | A   | 16   | B   | 26   | A   | 36   | D   |
| 7    | D   | 17   | C   | 27   | B   | 37   | A   |
| 8    | B   | 18   | C   | 28   | C   | 38   | C   |
| 9    | D   | 19   | C   | 29   | C   | 39   | C   |
| 10   | D   | 20   | B   | 30   | B   | 40   | B   |

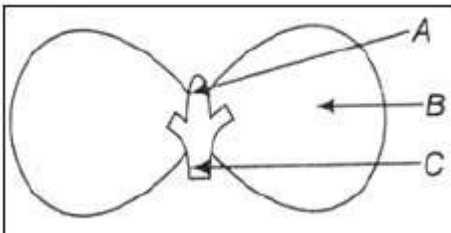
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## 7. HOW DO ORGANISMS REPRODUCE?

1. Reproduction is essential for living organisms in order to
  - a) Keep the individual organism alive
  - b) Fulfil their energy requirement
  - c) Maintain growth
  - d) Continue the species generation after generation
2. Arrange the following events of the menstrual cycle in correct sequence.
  - a) release of an egg from the ovary
  - b) breakdown of the thickened inner wall of the uterus
  - c) thickening of the wall of the uterus
  - d) maturation of the ovum

A. d → a → b → c  
B. a → b → d → c  
C. d → a → c → b  
D. a → c → d → b
3. Reproduction is essential for living organisms in order to
  - a) Keep the individual organism alive
  - b) Fulfil their energy requirement
  - c) Maintain growth
  - d) Continue the species generation after generation
4. In the below figure, parts A, B and C are, sequentially,



- a) Cotyledon, plumule and radical
  - b) Plumule, radicle and cotyledon
  - c) Plumule, cotyledon and radical
  - d) Radicle, cotyledon and plumule
5. Which of the following diseases is transmitted sexually?
    - a) Kala Azar
    - b) Jaundice
    - c) Cholera
    - d) Syphilis
  6. Which among the following is not the function of the testes at puberty?
    - i) Formation of germ cells
    - ii) Secretion of testosterone
    - iii) Development of placenta

iv) Secretion of oestrogen

- a) i and ii
- b) ii and iii
- c) iii and iv
- d) i and iv

7. IUCD is for

- a) Vegetative propagation
- b) Contraception
- c) Increasing fertility
- d) Avoiding miscarriage

8. Given are some events occurring in plant fertilisation.

- a) Pollen grains land on stigma.
- b) Tip of pollen tube breaks and releases the male gametes.
- c) Pollen tube is formed.
- d) Male gamete fuses with the egg.

Choose the option which represents the correct sequence of events?

- A.  $a \rightarrow b \rightarrow c \rightarrow d$
- B.  $a \rightarrow c \rightarrow b \rightarrow d$
- C.  $a \rightarrow d \rightarrow b \rightarrow c$
- D.  $a \rightarrow d \rightarrow c \rightarrow b$

9. Which among the following diseases is not sexually transmitted?

- a) Syphilis
- b) Hepatitis
- c) HIV-AIDS
- d) Gonorrhoea

10. A population of thermophilic archaebacteria are generally found in hot springs. Any change to the temperature of the water affects the survival of the archaebacteria. If the temperature of hot springs gets reduced, change in which component can allow the survival of a few members of these archaebacteria?

- a) Cell wall
- b) Cytoplasm
- c) DNA
- d) Ribosomes

11. The process in which small portions of the oviducts of a woman are removed by surgical operation, and the cut ends are ligated is

- a) copper T
- b) tubectomy
- c) vasectomy
- d) diaphragm

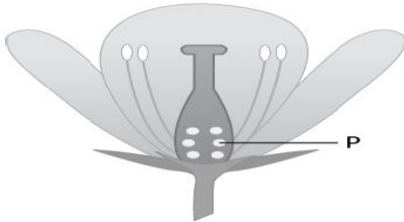
12. What conclusion can be made about the division in plasmodium?

- a) The cyst repeatedly divides to form many daughter cells.

- b) The cell divides multiple times giving rise to many daughter cells.
- c) The nucleus repeatedly divides inside the cell to form new daughter cells.
- d) The cyst enlarges in size and then bursts, producing many new daughter cells.

13. The ratio of the number of chromosomes in a human zygote and a human sperm is
- a) 2:1
  - b) 3:1
  - c) 1:2
  - d) 1:3
14. How do spores develop into Rhizopus?
- a) Spores divide and grow into a new individual
  - b) Spores combine with other spores and grow
  - c) Spores enlarge in size for the growth of new individual
  - d) Spores land on other organisms and increase with their growth in size

15. The image shows the structure of a flower.



Which of the following processes will likely be disturbed or not occur if the labelled part is removed from the flower?

- a) Formation of fruit
  - b) Transport of pollen
  - c) Formation of pollen
  - d) Development of the pollen tube
16. Which of the following options correctly shows the path that the sperms take when they are released from the male reproductive system?
- a) testis → ureter → urethra → penis
  - b) testis → vas deferens → ureter → penis
  - c) testis → ureter → vas deferens → penis
  - d) testis → vas deferens → urethra → penis
17. Bryophyllum can be propagated vegetatively by the
- a) stem
  - b) leaf
  - c) root
  - d) flower
18. Vegetative propagation refers to formation of new plants from
- a) stem, flowers and fruits
  - b) stem, leaves and flowers
  - c) stem, roots and flowers
  - d) stem, roots and leaves

19. Vegetatively propagated plants
- a) do not bear roots
  - b) do not bear buds
  - c) are genetically similar
  - d) are genetically dissimilar
20. In Rhizopus, tubular thread like structures bearing sporangia at their tips are called
- a) filaments
  - b) hyphae
  - c) rhizoids
  - d) roots
21. Plants like banana, rose, jasmine, orange have lost the capacity to produce
- a) seeds
  - b) buds
  - c) flower
  - d) roots
22. The seed that contains the future plant is called the
- a) cotyledons
  - b) seed coat
  - c) germ cells
  - d) embryo
23. The process of release of eggs from the ovary is called
- a) menstruation
  - b) reproduction
  - c) insemination
  - d) ovulation
24. The period during adolescence when the reproductive tissues begin to mature is called
- a) ovulation
  - b) puberty
  - c) germination
  - d) propagation
25. In human beings, the fertilization occurs in the
- a) uterus
  - b) ovaries
  - c) fallopian tubes
  - d) vagina
26. Along the path of the vas-deferens the secretions of which gland provide nutrition to the sperms?
- a) Prostate glands
  - b) Seminal vesicles
  - c) Scrotum
  - d) Urinary bladder

27. The embryo in humans gets nutrition from the mother's blood with the help of a special tissue called
- Placenta
  - Villi
  - Uterus
  - Womb
28. Which of the following method of contraception protects from acquiring sexually transmitted diseases?
- Surgery
  - Condoms
  - Copper-T
  - Oral-pills
29. The two oviducts in a human female unite into an elastic bag like is known as
- Vagina
  - Uterus
  - Fallopian tube
  - Cervix
30. Which is the portion on which grafting is done it provides the roots?
- Stock
  - Scion
  - Both a and b
  - None of these
31. Growing foetus derive nutrition from mother's blood through
- Uterus
  - Fallopian tube
  - placenta
  - cervix
32. IUCD is for
- Vegetative propagation
  - Contraception
  - Increasing fertility
  - Avoiding miscarriage
33. The correct sequence of reproductive stages seen in flowering plants is \_\_\_\_\_
- Gamete, zygote, embryo, seedling
  - zygote, gamete, embryo, seedling
  - seedling, embryo, zygote, gametes
  - gamete, embryo, zygote, seedling
34. The number of chromosomes present in parents and offspring of a particular species remains constant due to \_\_\_\_\_.
- Doubling of chromosomes during zygote formation
  - Halving of chromosomes during gamete formation
  - Doubling of chromosomes after gamete formation
  - Halving of chromosomes after gamete formation
35. In human females, an event that reflects onset of reproductive phase is :
- growth of body

- b) change in voice
- c) changes in hair pattern
- d) menstruation

36. The offspring formed by sexual reproduction exhibit more variations because \_\_\_\_\_.
- a) sexual reproduction is a lengthy process
  - b) genetic material comes from two parents of same species
  - c) genetic material comes from two parents of different species
  - d) genetic material comes from many parents
37. The seeds with two cotyledons are:
- a) fruit
  - b) dicot
  - c) monocot
  - d) flower
38. The triploid nucleus formed is called \_\_\_\_\_.
- a) fruit
  - b) seed
  - c) zygote
  - d) endosperm
39. Syngamy is :
- a) fusion of male gamete and female gamete in humans
  - b) fusion of male gamete and female gamete in non flowering plants
  - c) fusion of egg cell and male gamete in non flowering plants
  - d) fusion of egg cell and male gamete in flowering plants
40. Factors responsible for the rapid spread of bread mould on slices of bread are \_\_\_\_\_.
- a) lesser number of spores
  - b) availability of moisture and nutrients
  - c) presence of tubular branched hyphae
  - d) formation of round shaped sporangia
41. Which among the following statements are false for unisexual flowers?
- a) They always possess stamen and pistil
  - b) they possess either stamen or pistil
  - c) they show cross pollination
  - d) unisexual flowers possessing only stamens cannot produce fruits
42. Which among the following statements are false for sexual reproduction in flowering plants?
- a) it requires two types of gametes
  - b) fertilization is compulsory
  - c) it always results in formation of zygote
  - d) offspring are clones
43. The animals that give birth to young ones are called as :
- a) Oviparous
  - b) Viviparous

- c) both a and b
- d) None

44. Foetus is a:
- a) well developed embryo
  - b) developing embryo
  - c) A zygote
  - d) male gamete
45. The number of chromosomes in human sex cell is:
- a) 23
  - b) 23 pairs
  - c) 46
  - d) 46 pairs
46. **The number of autosomes in humans is:**
- a) 46
  - b) 44
  - c) 23
  - d) 22
47. Factors responsible for the rapid spread of bread mould on slices of bread are
- i) large number of spores
  - ii) availability of moisture and nutrients in bread
  - iii) presence of tubular branched hyphae
  - iv) formation of round shaped sporangia
- a) i and iii
  - b) ii and iv
  - c) i and ii
  - d) iii and iv
48. Which of the following statements are true for flowers?
- i) Flowers are always bisexual
  - ii) They are the sexual reproductive organs
  - iii) They are produced in all groups of plants
  - iv) After fertilisation they give rise to fruits
- a) i and iv
  - b) ii and iii
  - c) i and ii
  - d) i and iv
49. In human males, the testes lie in the scrotum, because it helps in the |
- a) process of mating
  - b) formation of sperm
  - c) easy transfer of gametes
  - d) all the above
50. Which of the following method of contraception protects from acquiring sexually transmitted diseases?
- a) Surgery
  - b) Condoms

- c) Copper-T
  - d) Oral-pills
51. There is a greater possibility for the evolution of a new species in organisms which reproduce by
- a) binary fission
  - b) budding
  - c) fertilisation
  - d) regeneration
52. Which is the most common method of reproduction in majority of fungi and bacteria?
- a) Budding
  - b) Spore formation
  - c) Binary fission
  - d) Multiple fission
53. Which of the following is not an artificial method of vegetative propagation?
- a) Cutting
  - b) Layering
  - c) Budding
  - d) Grafting
54. Pollen grains are produced by
- a) ovary
  - b) ovule
  - c) anther
  - d) corolla
55. The ability to reproduce is lost in a female after
- a) fertilisation
  - b) menstruation
  - c) gamete formation
  - d) menopause
56. When a sperm is deposited into the vagina then which route does it travel?
- a) Vagina → Oviduct → Uterus → Cervix
  - b) Vagina → Ovary → Uterus → Oviduct
  - c) Vagina → Cervix → Uterus → Oviduct
  - d) Vagina → Uterus → Cervix → Oviduct
57. What marks the beginning of the reproductive life of a woman?
- a) Menopause
  - b) Menarche
  - c) Fertilisation
  - d) Ovulation
58. A pair of duct arising from testis, which carry sperms are
- a) fallopian tube
  - b) vas deferens
  - c) oviduct
  - d) urethra



59. In the list of organisms given below, those that reproduce by the asexual method are
- i) banana
  - ii) dog
  - iii) yeast
  - iv) Amoeba
- a) (ii) and (iv)
  - b) (i), (iii) and (iv)
  - c) (i) and (iv)
  - d) (ii), (iii) and (iv)
60. A Planaria worm is cut horizontally in the middle into two halves P and Q such that the part P contains the whole head of the worm. Another Planaria worm is cut vertically into two halves R and S in such a way that both the cut pieces R and S contain half head each. Which of the cut pieces of the two Planaria worms could regenerate to form the complete respective worms?
- a) Only P
  - b) Only R and S
  - c) P, R and S
  - d) P, Q, R and S
61. An organism capable of reproducing by two asexual reproduction methods one similar to the reproduction in yeast and the other similar to the reproduction in Planaria is:
- a) Spirogyra
  - b) Hydra
  - c) Bryophyllum
  - d) Paramecium
62. Among the following select the statements that are true regarding the sexual reproduction in flowering plants?
- i) Fertilisation is a compulsory event
  - ii) It always results in the formation of zygote
  - iii) Offsprings formed are clones
  - iv) It requires two types of gametes
- a) i and iv
  - b) i, ii and iii
  - c) i, ii and iv
  - d) ii, iii and iv
63. Which among the following are not the functions of testes at puberty?
- i) Formation of germ cells
  - ii) Secretion of testosterone
  - iii) Development of placenta
  - iv) Secretion of estrogen
- a) i and ii
  - b) i and iii

- c) ii and iv
- d) iii and iv

### ASSERTION (A) AND REASON(R)

The following questions are Assertion-Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R). Answer these questions by 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 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.

64. **Assertion:** Amoeba reproduced by fission  
**Reason:** All unicellular organisms reproduced by asexual method.
65. **Assertion:** In human beings, the female. play a major role in determining the sex of the offspring.  
**Reason:** Women have two X chromosomes.
66. **Assertion:** Plants raised by vegetative propagation can bear flower and seed earlier than those produced from seeds.  
**Reason:** Plants which lost capacity to bear viable seeds, can propagate through vegetable propagation.
67. **Assertion:** Ovary releases one egg every month.  
**Reason:** The lining of uterus is always thick and spongy.
68. **Assertion:** An embryo is formed from fertilized egg.  
**Reason:** A monocot embryo comprises embryonic axis with two cotyledons.
69. **Assertion:** Scrotum is present outside the abdominal cavity.  
**Reason:** It stores sperms which require a lower temperature than the normal body temperature.
70. **Assertion:** Vagina is also called as birth canal.  
**Reason:** During birth, the baby passes through the vagina.
71. **Assertion:** Vasectomy is a surgical method of birth control.  
**Reason:** In vasectomy, small portion of oviduct is cut or tied properly.
72. **Assertion:** Pollen grains from the carpel stick to the stigma of stamen.  
**Reason:** The fertilised egg cells grow inside the ovules and become seeds.
73. **Assertion:** Characteristics of parental plants can be preserved through asexual reproduction.  
**Reason:** Vegetative reproduction involves only mitosis.
74. **Assertion:** Urethra in human male acts as urinogenital canal.  
**Reason:** Urethra carries only urine while sperms are carried by vasa deferentia only.
75. **Assertion:** During fertilization only head of spermatozoa enters egg.  
**Reason:** If several spermatozoa hit the egg at same time, all can enter the egg.
76. **Assertion:** Asexual reproduction is also called blastogenesis.  
**Reason:** In asexual reproduction, there is no formation and fusion of gametes.
77. **Assertion:** Plasmodium reproduces by multiple fission.  
**Reason:** Multiple fission is a type of asexual reproduction.

78. **Assertion:** In human male, testes are extra-abdominal which are present inside scrotum.  
**Reason:** Scrotum has a relatively lower temperature needed for the production and storage of sperms.
79. **Assertion:** Asexual reproduction is a primitive type of reproduction.  
**Reason:** Asexual reproduction involves only mitotic cell division.
80. **Assertion:** The offspring produced by sexual reproduction is likely to adjust better in environmental fluctuation.  
**Reason:** During the fusion of gametes there is mixing of genetic material from two parents.
81. **Assertion:** Spores are unicellular bodies.  
**Reason:** The parent body simply breaks up into smaller pieces on maturation.
82. **Assertion:** Testes lie in penis outside the body.  
**Reason:** Sperms require temperature lower than the body temperature for development
83. **Assertion:** Unisexual flowers have separate male and female flowers whereas a typical monocot embryo comprises an embryonic axis with single cotyledon.  
**Reason:** Cucumber, pumpkin and water melon are example of unisexual flowers.
84. **Assertion:** Ovary releases one every month.  
**Reason:** The lining of the uterus is always thick and spongy.
85. **Assertion:** Surgical methods are most effective methods of contraception.  
**Reason:** Surgical methods block gametes transport and hence prevent fertilization.
86. **Assertion:** In human beings the female produces two types of gametes.  
**Reason:** Female has two X chromosomes.
87. **Assertion:** A bisexual flower produces ova as well as the pollen.  
**Reason:** Ova and pollen are produced in the carpel.

### CASE-BASED QUESTIONS

#### Question 1:

The male reproductive system consists of portions which produce the germ-cells and other portions that deliver the germ-cells to the site of fertilisation. Testes are located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than normal body temperature. It also has a role of secretion of male sex hormone which brings changes in appearance seen in boys at the time of puberty. Vas deferens unites with a tube coming from urinary bladder. Urethra is a common passage for sperms and urine. Prostate gland and seminal vesicles add their secretions so that sperms are now in fluid.

88. Name the sex hormone associated with males.
- Testosterone
  - Progesterone
  - Oestrogen
  - None of these
89. Which of the following statements is incorrect?
- Sperms are present in a fluid
  - Fluid provides nutrition to sperms

- c) Fluid makes easier transportation of sperms
  - d) Fluid helps to bind the sperms together
90. Testes are located outside the abdominal cavity in scrotum because
- a) Sperms formation requires higher temperature than body temperature
  - b) Sperms formation requires lower temperature than normal body temperature
  - c) it is easier to transport sperms from the scrotum
  - d) None of these
91. Which of the following statement is incorrect?
- a) Sperms and urine has a common passage from urethra.
  - b) Sperms have long tail that helps them to move forward.
  - c) Sperms contain genetic material.
  - d) Sperms formation requires 1–3°C higher temperature than normal body temperature.

**Question2:**

Preethi is very fond of gardening. She has different flowering plants in her garden. One day few naughty children entered her garden and plucked many leaves of *Bryophyllum* plant and threw them here and there in the garden. After few days, Preethi observed that new *Bryophyllum* plants were coming out from the leaves which fell on the ground.

92. Which of the following plants can propagate vegetatively through leaves like *Bryophyllum*?
- a) Guava
  - b) Begonia
  - c) Ginger
  - d) Mint
93. Which of the following plant is artificially propagated (vegetatively) by stem cuttings in horticultural practices?
- a) Potato
  - b) Snake plant
  - c) Rose
  - d) Water hyacinth

**Question3:**

Menstrual cycle is the cycle of events taking place in female reproductive organs, under the control of sex hormones, in every 28 days. At an interval of 28 days, a single egg is released from either of two ovaries. Regular menstrual cycle stopped abruptly in married women. She got herself tested and was happy to discover that she is pregnant with her first baby.

94. Why menstruation stops in a pregnant female?
- a) The egg gets fertilised so need not to be expelled out of body
  - b) Ovulation stops during pregnancy and so do menstruation
  - c) Thick uterine lining is needed for proper development of embryo, so that it is retained
  - d) All of these

95. Select the correct sequence of acts that leads to pregnancy in a female.

- i) Fertilisation of egg
- ii) Ovulation
- iii) Formation of zygote
- iv) Implantation

- a. iii, i, iv, i
- b. ii,i,iii,iv
- c. i,ii,iii,iv
- d. ii,iv,i,iii

**ANSWERS**

| Q No | Ans | Q No | Ans | Q No | Ans | Q No | Ans | Q No | Ans |
|------|-----|------|-----|------|-----|------|-----|------|-----|
| 1    | d   | 21   | a   | 41   | a   | 61   | b   | 81   | c   |
| 2    | c   | 22   | d   | 42   | d   | 62   | c   | 82   | d   |
| 3    | d   | 23   | d   | 43   | b   | 63   | d   | 83   | b   |
| 4    | c   | 24   | b   | 44   | a   | 64   | a   | 84   | c   |
| 5    | d   | 25   | c   | 45   | a   | 65   | d   | 85   | a   |
| 6    | c   | 26   | b   | 46   | b   | 66   | b   | 86   | d   |
| 7    | b   | 27   | a   | 47   | c   | 67   | c   | 87   | c   |
| 8    | b   | 28   | b   | 48   | d   | 68   | c   | 88   | a   |
| 9    | b   | 29   | b   | 49   | b   | 69   | a   | 89   | d   |
| 10   | a   | 30   | a   | 50   | b   | 70   | a   | 90   | b   |
| 11   | b   | 31   | c   | 51   | c   | 71   | c   | 91   | d   |
| 12   | b   | 32   | b   | 52   | b   | 72   | d   | 92   | b   |
| 13   | a   | 33   | a   | 53   | c   | 73   | a   | 93   | c   |
| 14   | a   | 34   | b   | 54   | c   | 74   | c   | 94   | d   |
| 15   | a   | 35   | d   | 55   | d   | 75   | c   | 95   | b   |
| 16   | d   | 36   | b   | 56   | c   | 76   | b   |      |     |
| 17   | b   | 37   | b   | 57   | b   | 77   | b   |      |     |
| 18   | d   | 38   | d   | 58   | b   | 78   | a   |      |     |
| 19   | c   | 39   | d   | 59   | b   | 79   | b   |      |     |
| 20   | b   | 40   | b   | 60   | d   | 80   | a   |      |     |

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## 8. HEREDITY

- On crossing of two heterozygous smooth seeded plants (Rr), a total of 1000 plants were obtained in F1 Generation. What will be the respective number of smooth and wrinkle seed so obtained in F1 generation?
  - 750,250
  - 500,500
  - 800,200
  - 950,50
- Round and wrinkled characters of seed are due to dominant gene R and recessive gene r respectively. Which of the following crosses will give round and wrinkled seed in the same proportion?
  - RR X rr
  - Rr X rr
  - RR X Rr
  - Rr X rr
- The characters which appear in the first filial generations are called
  - recessive characters
  - dominant characters
  - lethal characters
  - non- mendelian characters
- Pea plants can have smooth seeds or wrinkled seeds. One of the phenotypes is completely dominant over the other. A farmer decides to pollinate one flower of a plant with smooth seeds using pollen from a plant with wrinkled seed. The resulting pea pod has all smooth seeds:



Which of the following conclusions can be drawn?

- The allele for smooth seed is dominant over that of wrinkled seeds.
  - The plant with smooth seed is heterozygous
  - The plant with wrinkled seed is homozygous
- 1 only
  - 1 and 2 only
  - 1 and 3 only
  - 1,2 and 3
- If a normal cell of a human body contains 46 pairs of chromosomes, then the number of chromosomes in a sex cell of a human being is most likely to be:
    - 92
    - 46
    - 22
    - 23
  - A trait in an organism is influenced by
    - Paternal DNA only
    - maternal DNA only
    - both maternal and paternal DNA
    - neither by paternal or maternal DNA
  - A plant with red flower (Rw) is cross bred with a plant with white flower(ww). There are two variations of the gene controlling the color of the flower, the gene for red flower(R) is Dominant over that for white flower (w)

Red flower

X

white flower



Rw

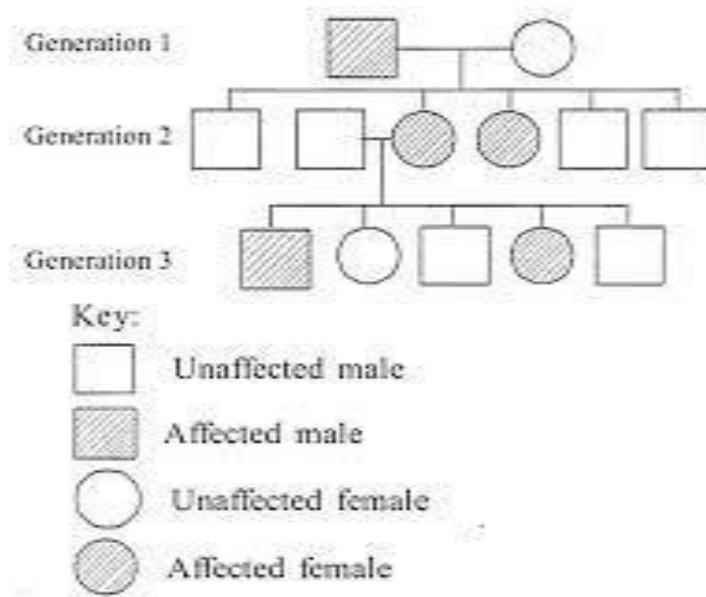
X

ww

What percentage of the plants are likely to produce white flowers?

- (a) 25% (b) 50% (c) 75% (d) 100%

8. Given below is a pedigree chart showing the inheritance of a certain linked trait in humans. The trait in the the pedigree is



- (a) Dominant X linked (b) Recessive X linked  
(c) Dominant Y linked (d) Recessive Y linked

9. A pure tall plant is crossed with a pure dwarf plant. What type of offspring will be produced in F1 generation?  
(a) Pure tall  
(b) Pure dwarf  
(c) Hybrid tall  
(d) Pure tall and pure dwarf
10. A Mendelian experiment consisted of dwarf tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers, but almost half of them are short. This suggests that the genetic make-up of the tall parent can be depicted as  
(a) TTWW  
(b) ttWw  
(c) TtWW

(d) TtWw

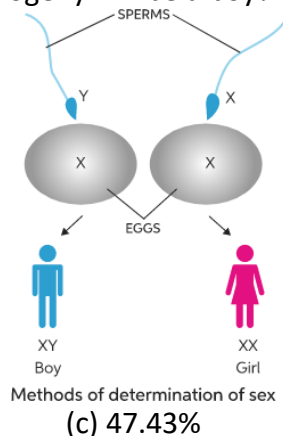
11. A zygote which has an X chromosome inherited from the father will develop into a
- (a) girl
  - (b) boy
  - (c) either boy or girl
  - (d) X chromosome does not influence the sex of a child
12. A man with blood group A marries a woman having blood group O. What will be the blood group of the child?
- (a) O only
  - (b) A only
  - (c) AB
  - (d) Equal chance of acquiring blood group A or blood group O.
13. If a round green seeded pea plant (RRyy) is crossed with a wrinkled yellow seed pea plant (rrYY) the seed produced in F1 generations are



- (a) round and green
  - (b) round and yellow
  - (c) wrinkled and green
  - (d) wrinkled and yellow
14. A cross between two individuals results in a ratio of 9:3:3:1 for four possible phenotypes of progeny. This is an example of a
- (a) Monohybrid cross
  - (b) F1 generation
  - (c) Dihybrid cross
  - (d) Test cross
15. Pure- bred pea plant A is crossed with pure bred pea plant B. It is found that the plants which look like A do not appear in F1 generation but re-emerge in F2 generation. Which of the plant A and B are tall and dwarf?
- (a) A are tall and B are dwarf
  - (b) A is tall and B is also tall
  - (c) A are dwarf and B are also dwarf
  - (d) A are dwarf and B are tall
16. Which section of DNA provides information for one protein
- (a) Nucleus
  - (b) Chromosomes
  - (c) trait
  - (d) Gene

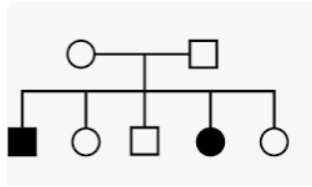


17. The genotype for the height of an organism is Tt. What conclusion may be drawn from this?  
 (a) The allele for height has at least two different genes.  
 (b) There are at least two different alleles for the gene for height.  
 (c) There are two different genes for height, each having a single allele.  
 (d) There is one allele for height with two different alleles.
18. Who has a perfect pair of chromosomes?  
 (a) girls only  
 (b) Boys only  
 (c) Both boys and girls  
 (d) It depends on many other factors
19. Two pink colored flowers on crossing results in 1 red, 2 pink and 1 white progeny. The nature of the cross will be  
 (a) Cross pollination  
 (b) Self pollination  
 (c) Double fertilization  
 (d) No fertilization
20. In human males all chromosomes are perfectly paired except one. This/these unpaired chromosomes are/is  
 (i) large chromosome  
 (ii) Small chromosome  
 (iii) Y-chromosome  
 (iv) X-chromosome  
 (a) i and ii  
 (b) iii only  
 (c) iii and iv  
 (d) ii and iii
21. In a plant smooth seeds (S) are dominant over wrinkled seeds (s) and green seeds (G) are dominant over yellow seeds (g). A plant homozygous for smooth and green seed is crossed with a plant having wrinkled and yellow seeds. The F1 offspring are self-pollinated to produce F2 generation. If a total of 160 offspring are produced, how many plans are expected to be having wrinkled and green seeds in F2 generation, according to a typical mendelian cross?  
 (a) 90 (b) 30 (c) 20 (d) 10
22. What is the probability that the male progeny will be a boy?



- (a) 50% (b) 56% (c) 47.43% (d) It varies

23. What determines the differences between the progeny and parents?  
 (a) Inheritance (b) Heritage  
 (c) Genetics (d) Variation
24. Given pedigree chart depicts the inheritance of attached ear-lobes, an autosomal recessive trait. Which among the following drawn is correct?



- (a) Parents are heterozygous dominant  
 (b) Parents are homozygous dominant  
 (c) parents are homozygous recessive  
 (d) None of these
25. Humans inherit color of their eyes from their parents. Brown-eyed couple has three blue-eyed children. Which of the following statements gives correct explanation of this situation?  
 (i) Each parent has an allele for brown eyes and an allele for blue eyes  
 (ii) the allele for blue eyes is recessive  
 (iii) the probability that their next child will have blue eyes is 75%  
 (iv) The probability that their next child will have brown eyes is 50%
- (a) (i) and (ii) only  
 (b) (i) and (iii) only  
 (c) (ii) and (iv) only  
 (d) (iii) and (iv) only

**CASE STUDY :1**

The two sexes participating in sexual reproduction must be somewhat different from each other for a number of reasons. How is the sex of a new born individual determined? Different species use very different strategies for this. Some rely entirely on environmental cues. Thus, in some animals like a few reptiles, the temperature at which fertilized eggs are kept determines whether the animal developing in the eggs will be male or female. In other animals, such as snails, individuals can change sex, indicating that sex is not genetically determined. However, in human beings, the sex of the individual is largely genetically determined. In other words, the genes inherited from our parents decide whether we will be boys or girls.

26. In reptiles, sex in the developing eggs will be determined by  
 (a) Genes  
 (b) Chromosomes  
 (c) Temperature  
 (d) Rainfall
27. The chromosomes which decides the sex of an individual in human beings are  
 (a) XX and XY  
 (b) XY and XY  
 (c) XX and XX  
 (d) YY and YY
28. Inheritance of \_\_\_\_\_ from our parents decides whether we will be boys or girls.  
 (a) Proteins  
 (b) Genes  
 (c) Characters  
 (d) Cytoplasm

**CASE STUDY:2**

The cross that includes the inheritance of two pairs of contrasting characters simultaneously is referred as dihybrid cross. Mendel chose pure breeding plants for yellow and green seeds and the round and wrinkled shape of seeds. He cross pollinated the plant having yellow round seeds with plants having green wrinkled seeds. All the plants produced in the F1 generation were having yellow round seeds. The plants raised from the seeds were self- pollinated, which resulted in production of plants having four phenotypically different type of seeds.

29. When a cross between a yellow round seeded plant (YyRr) and a yellow wrinkled seeded plant (Yyrr), What are phenotypes of the offspring in F1 generation?  
(a) Yellow and round  
(b) Yellow and wrinkled  
(c) Green and round  
(d) Green and wrinkled
30. What will be the genotypic ratio for dihybrid cross?  
(a) 3:1      (b) 1:2:1      (c) 9:3:3:1      (d) 12:4
31. The percentage of yr gamete produced by YyRr parent will be  
(a) 25%      (b) 50%      (c) 75%      (d) 12.5%
32. A plant with red flower (Rw) is cross bred with a plant with white flower (ww). There are two variations of the gene controlling the colour of the flower. The gene for red flower (R) is dominant over that for white flower (w).

**Red flower (Rw)**

**White flower (ww)**

The punnett square shows the result of the cross.

|   |    |    |
|---|----|----|
|   | w  | w  |
| R | Rw | Rw |
| w | ww | ww |

What percentage of the plants is likely to produce white flowers?

- (a) 25%  
(b) 50%  
(c) 75%  
(d) 100%
33. Which of the following best defines heredity?  
(a) the study of genes and their functions  
(b) The passing of traits from parents to off springs  
(c) The interaction between genes and the environment  
(d) the process of genetic recombination
34. Which of these traits is acquired by a human population in response to the environment?  
(a) short hair

- (b) Body mass  
 (c) Tall height  
 (d) Brown eyes
35. Which of the following is not an example of a recessive trait?  
 (a) Brown eyes  
 (b) Attached ear lobes  
 (c) Type O blood  
 (d) Hitchhiker's thumb
36. In a monohybrid cross between two heterozygous individuals, percentage of heterozygous individuals obtained in F1 generation is  
 (a) 25%  
 (b) 50%  
 (c) 75%  
 (d) 100%
37. Select the correct statement among the following.  
 (a) Human female possesses homogametic sex chromosomes  
 (b) Males possess homogametic sex chromosomes  
 (c) Human female possesses heterogametic sex chromosomes  
 (d) Human male possesses homomorphic sex chromosomes
38. In pea plants, tall phenotype is dominant over dwarf phenotype, and the alleles are designated as T and t respectively. Upon crossing one tall and one dwarf plant, total 250 plants were obtained out of which 124 displayed tall phenotype and rest were dwarf. Thus, the genotype of the parent plants was  
 (a) TT X TT  
 (b) TT X tt  
 (c) Tt X Tt  
 (d) Tt X tt
39. A flower species can have either red petals (RR or Rr) or white petals(rr), with red being dominant over white. If a homozygous red flower is crossed with a white flower, what is the expected phenotypic ratio of their offspring?  
 (a) 1:0 red to white  
 (b) 1:1 red to white  
 (c) 3:1 red to white  
 (d) 2:1 red to white
40. Which of the following is the correct genotype of the mother and the father?

|     | Mother | Father |
|-----|--------|--------|
| (a) | XX     | XY     |
| (b) | xx     | XY     |
| (c) | Xx     | xY     |
| (d) | xx     | xY     |

41. In a population of cats, black fur color(B) is dominant over white fur color (b). If a black Cat mates with a white cat and produce a litter of kittens, but all the kittens have Black fur what can you infer about the genotypes of the parents?  
 (a) Both parents must be heterozygous (Bb)  
 (b) Both parents must be homozygous dominant (BB)  
 (c) Both parents must be homozygous recessive (bb)

- (d) It is not possible to determine the genotypes of the parents based on this information
42. In a population of rabbits, the presence of a recessive allele "b" determines black fur color, while the dominant allele "B" determines brown fur color. If two rabbits heterozygous for fur color (Bb) mate, what is the expected phenotype ratio of their offspring?
- (a) 1 : 1 Black to brown
  - (b) 3 : 1 black to brown
  - (c) 1 : 3 black to brown
  - (d) 1 : 2 : 1 black to brown to albino
43. The principles of inheritance proposed by Gregor Mendel are based on:
- (a) The study of pea plants
  - (b) Observations of human families
  - (c) Experiments with bacteria
  - (d) Observations of genetic mutations
44. Which of the following statements is incorrect?
- (a) For every hormone there is a gene
  - (b) For every protein there is a gene
  - (c) for production of every enzyme there is a gene
  - (d) for every type of fat there is a gene
45. A zygote which has inherited an X chromosome from the father will develop into:
- (a) baby boy
  - (b) baby girl
  - (c) adult
  - (d) either boy or girl
46. The sex of a child is determined by which of the following?
- (a) the length of the mother's pregnancy
  - (b) the length of time between ovulation and copulation
  - (c) the presence of an X chromosome in an ovum
  - (d) the presence of Y chromosome in a sperm
47. In order to ensure that he had pure breeding plants for his experiments, Mendel:
- (a) cross fertilized each variety with each other
  - (b) let each variety self-fertilize for several generations
  - (c) removed the female parts of the plants
  - (d) removed the male parts of the plants
48. If the ratio of each phenotype of the seeds of pea plants in the F<sub>2</sub> generation is 9 : 3 : 3 : 1 it is known as:
- (a) Tetrahybrid ratio
  - (b) Monohybrid ratio
  - (c) Dihybrid ratio
  - (d) Trihybrid ratio
49. Select the statements that describes characteristics of genes:
- (i) genes are specific sequence of bases in a DNA molecule
  - (ii) a gene does not code for proteins
  - (iii) in individuals of given species, a specific gene is located on a particular chromosome
  - (iv) each chromosome has only one gene
- (a) (i) and (ii)
  - (b) (i) and (iii)
  - (c) (i) and (iv)
  - (d) (ii) and (iv)

50. A normal cell of human body contains 23 pairs of chromosomes. the number of Chromosomes in a sex cell (sperm or ovum) of a human being is most likely to be
- (a) 46
  - (b) 23
  - (c) 21
  - (d) 42

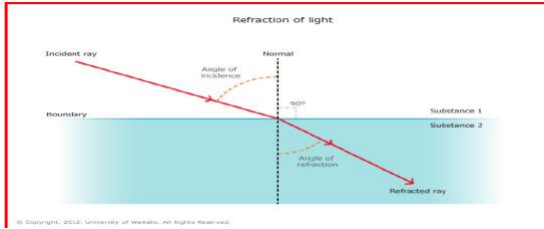
### ANSWERS

| Qn No | Ans | Qn No | Ans | Qn No | Ans | Qn No | Ans | Qn No | Ans |
|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
| 1     | a   | 11    | a   | 21    | a   | 31    | b   | 41    | a   |
| 2     | b   | 12    | d   | 22    | a   | 32    | b   | 42    | b   |
| 3     | b   | 13    | b   | 23    | d   | 33    | b   | 43    | a   |
| 4     | c   | 14    | d   | 24    | b   | 34    | a   | 44    | d   |
| 5     | d   | 15    | a   | 25    | a   | 35    | a   | 45    | b   |
| 6     | c   | 16    | d   | 26    | c   | 36    | b   | 46    | d   |
| 7     | b   | 17    | b   | 27    | a   | 37    | a   | 47    | b   |
| 8     | a   | 18    | a   | 28    | b   | 38    | d   | 48    | c   |
| 9     | c   | 19    | b   | 29    | a   | 39    | a   | 49    | b   |
| 10    | c   | 20    | c   | 30    | c   | 40    | a   | 50    | b   |

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## 9.LIGHT-REFLECTION AND REFRACTION

1.



A ray of light enters obliquely from one medium to another medium of different optical densities. Which of the following is the most appropriate statement?

- (a) Only bending in path of light takes place.
- (b) Only speed of light changes.
- (c) Both bending in path and change in speed of light take place.
- (d) Neither bending in path nor change in the speed of light takes place.

2.

A ray of light enters normally from one medium to another medium of different optical densities. Which of the following is the most appropriate statement?

- (a) Only bending in path of light takes place.
- (b) Only speed of light changes.
- (c) Both bending in path and change in speed of light take place.
- (d) Neither bending in path nor change in the speed of light takes place.

3.

There no change in the path of ray of light entering from one medium to another. What do you infer from the statement?

- (a) Both the medium have same optical densities
- (b) Both medium are opaque
- (c) Both medium have different refractive indices
- (d) None of the above

4.

A ray of light enters from vacuum to medium A , medium B and medium C at same angle of incidence. If Speed in medium A < Speed in medium B < Speed in medium C. Write the angle of refraction in increasing order.

- (a) Angle of refraction in Medium C < Angle of refraction in Medium B > Angle of refraction in Medium A
- (b) Angle of refraction in Medium C > Angle of refraction in Medium B < Angle of refraction in Medium A
- (c) Angle of refraction in Medium C < Angle of refraction in Medium B < Angle of refraction in Medium A
- (d) Angle of refraction in Medium C > Angle of refraction in Medium B > Angle of refraction in Medium A

5.

The spherical mirror that can produce erect and enlarged image is

- a) convex mirror.
- b) Concave mirror
- c) plane mirror
- d) glass slab

6.

The size of the image is small and inverted, the type of spherical mirror would be.

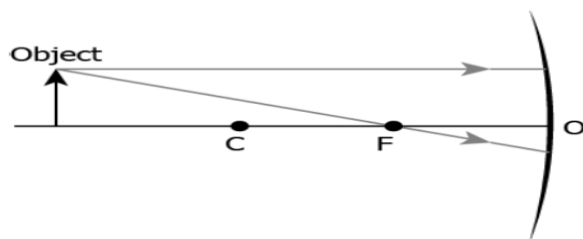
- (a) Concave mirror
- (b) Convex mirror
- (c) plane mirror
- (d) none of the above

7. Which type of mirror is used in vehicles and why?  
 (a) Convex, for narrow field of view.  
 (b) Concave, for increased field of view.  
 (c) Convex, for increased field of view.  
 (d) Plane mirror, for increased field of view.
8. In solar furnace also spherical mirrors are used to concentrate sunlight at a particular point. What is the surface of the mirror.  
 (a) plane (b) Convex (c) Concave (d) any surface can be used
9. The focal length of a rectangular plane mirror of length 15 cm and breadth 5 cm is  
 (a) 5 cm (b) 15 cm (c) 20 cm (d) Infinity.
10. If 'v' is the symbol used for image distance and 'u' for object distance, what will be the sign for v/u in the given case  
 (a) Positive (b) Negative (c) Cannot be predicted (d) can be both.
11. Consider the following properties of a virtual image:  
 i. cannot be obtained on the screen  
 ii. are formed by both concave and convex lens  
 iii. always erect  
 iv. always inverted  
 The correct properties are:  
 (a) (i) and (iv) (b) (i) and (ii)  
 (c) (i), (ii), and (iii) (d) (i), (ii) and (iv)
12. Suppose you want to obtain an enlarged, real and inverted image using a convex lens. The object should be placed:  
 (a) between optical centre and Focus F<sub>1</sub> of lens  
 (b) between F<sub>1</sub> and 2F<sub>1</sub>  
 (c) Beyond F<sub>1</sub> (d) at F<sub>1</sub>
13. To determine the appropriate focal length of the given convex lens by focussing a distant object (say, a tree), you try to focus the image of the object on a screen. The image you obtain on screen is always  
 (a) erect and laterally inverted  
 (b) erect and diminished  
 (c) inverted and diminished  
 (d) virtual, inverted, and diminished.
14. Why are concave mirrors typically placed at corners and junctions of corridors in the warehouse?  
 (a) Concave mirrors are strategically placed at corners and junctions of corridors, providing a wide field of view.  
 (b) Concave mirrors are strategically placed at corners and junctions of corridors, providing a narrow field of view.  
 (c) Concave mirrors are cheaper.



- (d) Concave mirrors increase the appeal of the building.
15. How do concave mirrors form images in the security system?
- (a) Concave mirrors refract and diverge light rays, creating virtual, upright, and magnified images of the monitored areas.
  - (b) Concave mirrors reflect and diverge light rays, creating real, upright, and magnified images of the monitored areas.
  - (c) Concave mirrors reflect and converge light rays, creating virtual, inverted, and diminished images of the monitored areas.
  - (d) Concave mirrors reflect and converge light rays, creating virtual, upright, and magnified images of the monitored areas.
16. What benefits do concave mirrors offer in the security system?
- (a) Concave mirrors provide a narrow view, maximize blind spots, and act as a deterrent to potential intruders.
  - (b) Concave mirrors provide a panoramic view, minimize blind spots, and act as a deterrent to potential intruders.
  - (c) Concave mirrors provide a zero, minimize blind spots, and act as a deterrent to potential intruders.
  - (d) Concave mirrors provide good appeal to the building
17. Where are convex mirrors typically installed in the warehouse?
- (a) Convex mirrors are installed at blind spots such as blind corners, narrow hallways, and parking areas.
  - (b) Convex mirrors are installed on top of the buildings
  - (c) Convex mirrors are installed on ceilings.
  - (d) Convex mirrors are installed in washrooms and conference rooms.
18. How do convex mirrors form images in the security system?
- (a) Convex mirrors diverge light rays, creating virtual, upright, and diminished images that provide an expanded view.
  - (b) Convex mirrors converge light rays, creating virtual, upright, and diminished images that provide an expanded view.
  - (c) Convex mirrors diverge light rays, creating real, upright, and diminished images that provide an expanded view.
  - (d) Convex mirrors converge light rays, creating virtual, upright, and enlarged images that provide a narrow view.
19. When a plane mirror is rotated through a certain angle, the reflected ray turns through twice as much and the size of the image:
- (a) is doubled
  - (b) is halved
  - (c) becomes infinite
  - (d) remains the same

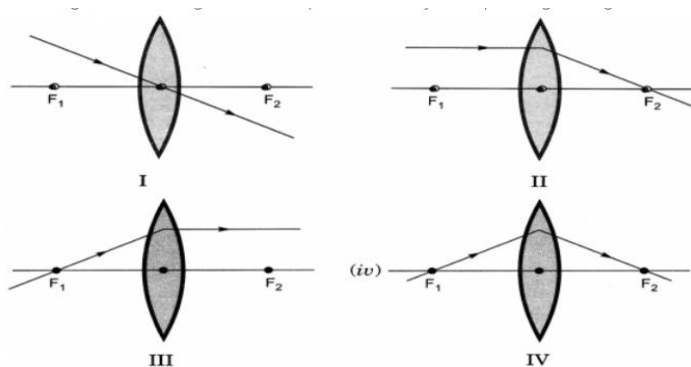
20. The image shows the path of incident rays to a concave mirror.



Where would the reflected rays meet for the image formation to take place?

- (a) Behind the mirror
  - (b) Between F and O
  - (c) Between C and F
  - (d) Beyond C
21. An object is placed at a distance of 40cm in front of a concave mirror of a focal length of 20 cm. The image produced is:
- (a) virtual and inverted
  - (b) real and erect
  - (c) real, inverted and of the opposite size as that of the object
  - (d) real, inverted and of the same size as that of the object
- A student studies that a convex lens always forms a virtual image irrespective of its position.
22. What causes the convex mirror to always form a virtual image?
- (a) Because the reflected ray never intersects
  - (b) Because the reflected ray converges at a single point
  - (c) Because the incident ray traces its path back along the principal axis
  - (d) Because the incident ray of a convex mirror gets absorbed in the mirror
23. Magnification produced by a rear view mirror fitted in vehicles:
- (a) is less than one
  - (b) is more than one
  - (c) is equal to one
  - (d) can be more than or less than one, depending upon the position of the object in front of it
24. Which of the following can make a parallel beam of light from a point source incident on it?
- (a) Concave mirror as well as convex lens
  - (b) Convex mirror as well as concave lens
  - (c) Two plane mirrors placed at 90degree to each other
  - (d) Concave mirror as well as concave lens
25. For a real object, which of the following can produce a real image?
- (a) Plane mirror
  - (b) Concave mirror

- (c) Concave lens  
(d) Convex mirror
26. An object at a distance of + 15 cm is slowly moved towards the pole of a convex mirror. The image will get  
(a) shortened and real  
(b) enlarged and real  
(c) enlarge and virtual  
(d) diminished and virtual
27. The image formed by concave mirror is real, inverted and of the same size as that of the object. The position of object should be  
(a) at the focus  
(b) at the centre of curvature  
(c) between focus and centre of curvature  
(d) beyond centre of curvature
28. The angle of incidence  $i$  and refraction  $r$  are equal in a transparent slab when the value of  $i$  is  
(a)  $0^\circ$   
(b)  $45^\circ$   
(c)  $90^\circ$   
(d) depend on the material of the slab
29. Which of the following can make a parallel beam of light when light from a point source is incident on it  
(a) Concave mirror as well as convex lens  
(b) Convex mirror as well as concave lens  
(c) Two plane mirrors placed at  $90^\circ$  to each other  
(d) Concave mirror as well as concave lens
30. The diagram that shows the correct path of light ray after it passes the lens



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

31. Light from the Sun falling on a convex lens will converge at a point called  
(a) centre of curvature    (b) focus  
(c) radius of curvature    (d) optical centre
32. A divergent lens will produce  
(a) always real image        (b) always virtual image  
(c) both real and virtual image (d) none of these
33. The speed of light is fastest in:  
a) Air                    b) Water  
c) Glass                d) Vacuum
34. The focal length of a lens is a measure of its:  
a) Thickness            b) Curvature  
c) Refractive index d) Ability to bend light
35. The size of the image formed by a convex lens depends on:  
a) The size of the object        b) The focal length of the lens  
c) The distance between the object and the lens d) All of the above
36. The image formed by a concave lens can be projected onto a screen when the object is placed:  
a) At the focal length            b) Beyond the focal length  
c) Between the focal point and the lens d) None of the above
37. The image of an object placed in front of a convex mirror is formed at  
(a) the object itself  
(b) twice the distance of the object in front of the mirror  
(c) half the distance of the object in front of the mirror  
(d) behind the mirror
38. An object is placed at 10 cm in front of a plane mirror, then the distance of image from mirror will be  
(a) 5 cm        (b) 10 cm  
(c) 20 cm        (d) 0
39. An object is placed 20 cm from the concave mirror of focal length 10 cm, then image is formed at  
(a) behind the mirror        (b) between the mirror and focus  
(c) at focus                    (d) centre of curvature of mirror
40. The laws of reflection hold true for:  
(a) plane mirrors only  
(b) concave mirrors only  
(c) convex mirrors only  
(d) all reflecting surfaces

41. A spherical mirror and a thin spherical lens have each a focal length of -15 cm. The mirror and the lens are likely to be  
 (a) both concave (b) both convex  
 (c) the mirror is concave and the lens is convex.  
 (d) the mirror is convex, but the lens is concave
42. Which of the following lenses would you prefer to use while reading small letters found in a dictionary?  
 (a) A convex lens of focal length 50 cm.  
 (b) A concave lens of focal length 50 cm.  
 (c) A convex lens of focal length 5 cm.  
 (d) A concave lens of focal length 5 cm.
43. An object is placed at 0.25 m in front of a plane mirror. The distance between the object and image will be  
 (a) 0.25 m  
 (b) 1.0 m  
 (c) 0.5 m  
 (d) 0.125 m
44. Which of the following mirror is used by a dentist to examine a small cavity?  
 (a) Convex mirror  
 (b) Plane mirror  
 (c) Concave mirror  
 (d) Combination of convex and concave mirror

**Following questions 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 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.
45. **Assertion(A)** : The centre of curvature is not a part of the mirror. It lies outside its reflecting surface.  
**Reason (R)** : The reflecting surface of a spherical mirror forms a part of a sphere. This sphere has a centre.
46. **Assertion (A)** : Light does not travel in the same direction in all the media.  
**Reason (R)** : The speed of light does not change as it enters from one transparent medium to another.
47. **Assertion(A)** : A ray of light travelling from a rarer medium to a denser medium slows down and bends away from the normal. When it travels from a denser medium to a rarer medium, it speeds up and bends towards the normal.  
**Reason (R)** : The speed of light is higher in a rarer medium than a denser medium.
48. **Assertion(A)**: The mirrors used in search lights are concave spherical.  
**Reason (R)** : In concave spherical mirror the image formed is always virtual.
49. **Assertion(A)** : Light travels faster in glass than in air.  
**Reason (R)** : Glass is denser than air.

50. **Assertion (A)** : A convex mirror is used as a driver's mirror.  
**Reason (R)** : Convex mirrors have a wider field of view as they are curved outwards. They also give an erect, though diminished image

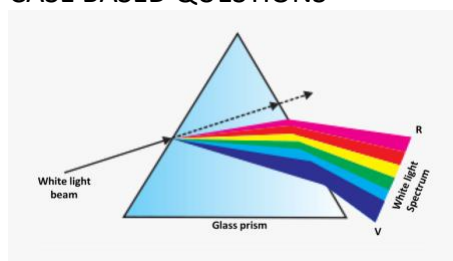
### ANSWERS

| Qn No | Ans | Qn No | Ans | Qn No | Ans | Qn No | Ans | Qn No | Ans |
|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
| 1     | a   | 11    | c   | 21    | d   | 31    | b   | 41    | d   |
| 2     | d   | 12    | b   | 22    | a   | 32    | b   | 42    | c   |
| 3     | a   | 13    | c   | 23    | a   | 33    | d   | 43    | c   |
| 4     | d   | 14    | a   | 24    | a   | 34    | d   | 44    | c   |
| 5     | b   | 15    | d   | 25    | b   | 35    | d   | 45    | a   |
| 6     | a   | 16    | b   | 26    | d   | 36    | d   | 46    | c   |
| 7     | c   | 17    | a   | 27    | b   | 37    | d   | 47    | d   |
| 8     | c   | 18    | a   | 28    | a   | 38    | d   | 48    | c   |
| 9     | d   | 19    | d   | 29    | a   | 39    | d   | 49    | d   |
| 10    | b   | 20    | c   | 30    | c   | 40    | d   | 50    | d   |

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## 10.HUMAN EYE AND THE COLOURFUL WORLD

### CASE BASED QUESTIONS



Take a thick sheet of cardboard and make a small hole or narrow slit in its middle. Allow sunlight to fall on the narrow slit. This gives a narrow beam of white light. Now, take a glass prism and allow the light from the slit to fall on one of its faces as shown in figure. Turn the prism slowly until the light that comes out of it appears on a nearby screen.

- When the prism is turned slowly in the above activity, it is observed that:
  - White light comes out of the prism on a nearby screen
  - A band of seven colours is observed on a nearby screen with red and indigo colours at the two ends.
  - A band of seven colours is observed on a nearby screen with yellow and violet colours at the two ends.
  - A band of seven colours is observed on a nearby screen with red and violet colours at the two ends.

Select the incorrect observations from the above:

- Both (i) and (ii)
  - Both (ii) and (III)
  - (i), (ii) and (iii)
  - (i) , (iii) and (iv)
- Which colour of light deviates the most on passing white light through a prism?
    - red
    - green
    - blue
    - violet
  - The angle of deviation of a light ray when passed through a prism depends on
    - The angle of the prism
    - The material of the prism
    - The surrounding medium
    - All the above
  - The phenomenon of dispersion was discovered by
    - Einstein
    - Newton
    - Rayleigh
    - Edison

ASSERTION / REASON (MCQ) Following questions 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 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.

- Assertion(A) : White light is dispersed into its components when incident obliquely on one of the faces of a prism.

Reason (R) : Different colours of light bend through different angles with respect to the incident ray as they pass through a prism.

- Assertion(A) : The rays of different colours emerge along different paths from a glass prism.  
Reason (R) :Light rays undergo refraction and bend away from the normal when they travel from glass prism to air.





- a. It is caused due to excessive curvature of the eye lens
- b. It may be caused due to elongation of the eyeball.
- c. The image of a distant object is formed behind the retina.
- d. It is corrected by using a concave lens of appropriate power.

17. The far point of a myopic person is 50 cm in front of the eyes. The nature and power of the lens required for correcting the problem is

|    | Nature of lens | Power of lens |
|----|----------------|---------------|
| a. | concave        | -0.5D         |
| b. | Concave        | -2.0D         |
| c. | Convex         | +0.5D         |
| d. | Convex         | +2.0D         |

18. A person needs a lens of power -4.5D for correction of her vision. The nature of lens and its focal length is:

|    | Nature of lens | Focal length |
|----|----------------|--------------|
| a. | Concave        | -45cm        |
| b. | Convex         | +45cm        |
| c. | Convex         | +22.22cm     |
| d. | Concave        | -22.22cm     |

19. Harshit is trying to observe the stars in the sky, but he finds that the position of the stars is changing continuously. This is due to

- a. Reflection of light from star
- b. Atmospheric refraction
- c. Scattering of light
- d. Dispersion of light

20. **Assertion(A)** : A rainbow is sometimes seen in the sky in rainy season only when observer's back is towards the Sun.

**Reason (R)** : The tiny droplets act as small prisms resulting in the formation of rainbow.

21. **Assertion(A)**: Danger signals are of red colour.

**Reason (R)**: Velocity of red light in air is maximum in comparison to the other colours, so signals are visible even in dark.

22. **Assertion(A)**: The sky looks dark and black instead of blue in outer space.

**Reason (R)**: No atmosphere in the outer space to scatter sunlight.

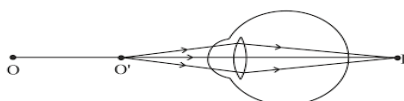
23. **Assertion(A)**: The Sun appears flattened at sunrise and sunset.

**Reason (R)** : The apparent flattening of the Sun's disc at sunrise and sunset is due to atmospheric refraction.

24. **Assertion (A)** : Blue colour of the clear sky is due to atmospheric refraction.

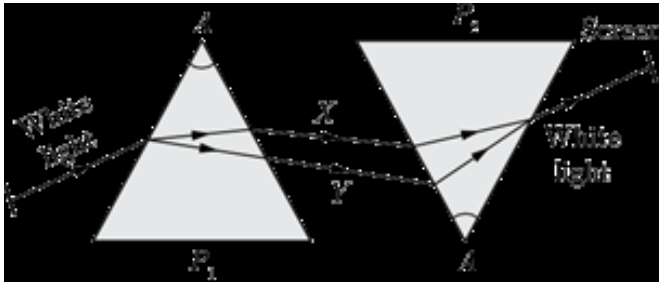
**Reason (R)** : Blue light has shorter wavelength compared to red.

25. Identify the defect of the eye that is represented here.



- a. Myopia
- b. Presbyopia
- c. Hpermetropia

- d. cataract
26. The defect of the eye can be corrected by
- concave lens
  - convex lens
  - cylindrical lens
  - bifocal lens
27. At noon the Sun appears white as
- blue colour is scattered the most
  - Red colour is scattered the most
  - Light is least scattered
  - all the colours of white light are scattered away.
28. The air layer of atmosphere whose temperature is less than the hot layer, behave as optically
- denser medium
  - rarer medium
  - inactive medium
  - both rarer and denser medium
29. Bi-focal lens are used to correct the following defect
- Myopia
  - Astigmatism
  - Hypermetropia
  - presbyopia
- 30.



Here X and Y indicates

- Green colour, violet colour
- Red colour, violet colour
- Violet colour, red colour
- Green colour, red colour

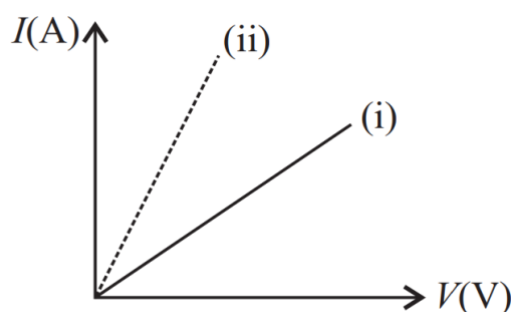
### ANSWERS

| Q.No | Ans | Q.No | Ans | Q.No | Ans |
|------|-----|------|-----|------|-----|
| 1    | C   | 11   | A   | 21   | C   |
| 2    | A   | 12   | D   | 22   | A   |
| 3    | D   | 13   | A   | 23   | A   |
| 4    | B   | 14   | C   | 24   | D   |
| 5    | A   | 15   | B   | 25   | C   |
| 6    | B   | 16   | C   | 26   | B   |
| 7    | C   | 17   | B   | 27   | C   |
| 8    | C   | 18   | D   | 28   | A   |
| 9    | B   | 19   | B   | 29   | D   |
| 10   | B   | 20   | A   | 30   | B   |

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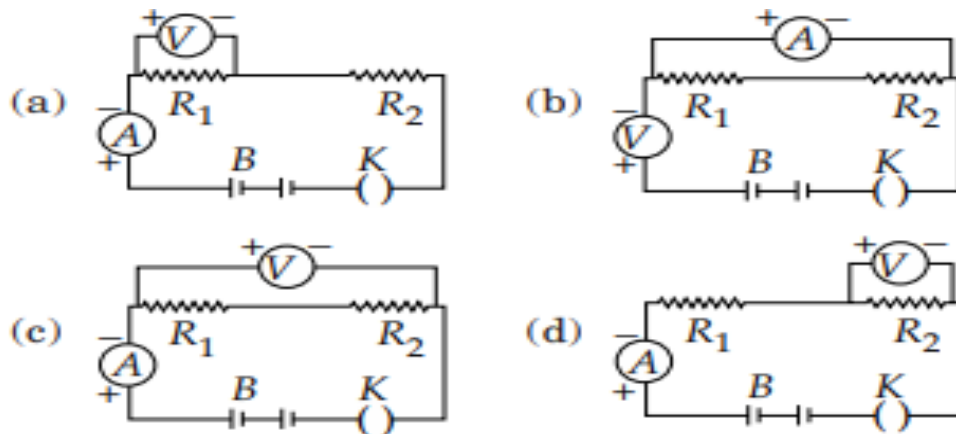
## 11. ELECTRICITY

- The amount of heat produced in a conductor is
  - directly proportional to the current flowing through it
  - inversely proportional to the current flowing through it
  - directly proportional to the square of the current flowing through it
  - inversely proportional to the square of current flowing through it.
- A circuit is left on for several minutes, causing the connecting copper wire to become hot. As the temperature of the wire increases, the electrical resistance of the wire
  - decreases
  - remains the same
  - increases
  - increases for some time and then decreases
- The given figure shows the I-V curve (i) for a nichrome wire of given length and cross-section. Which of the following will yield the curve (ii)?

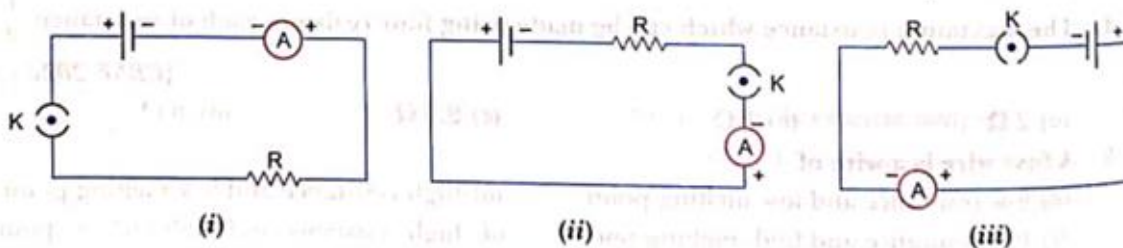


- Increase the length of nichrome wire.
  - Decrease the thickness of nichrome wire.
  - Replace the nichrome wire with a similar copper wire.
  - Replace the nichrome wire with a similar silicon wire.
- If current through a resistance is increased by 100%, simultaneously reducing resistance value to 25%, the new power dissipated will be
    - same
    - increased by 100%
    - decreased by 400%
    - increased by 400%.
  - The resistivity does not change if
    - the material is changed
    - the temperature is changed
    - the shape of the resistor is changed
    - both material and temperature are changed
  - A cylindrical conductor of length  $l$  and uniform area of cross section  $A$  has resistance  $R$ . Another conductor of length  $2l$  and resistance  $R$  of the same material has area of cross-section
    - $A/2$
    - $3A/2$
    - $2A$
    - $3A$
  - If a wire of resistance  $R$  is melted and recast to half its length, the new resistance of the wire will be
    - $R/4$
    - $R/2$
    - $R$
    - $2R$
  - Consider a simple circuit containing a battery and three identical incandescent bulbs A, B and C. Bulb A is wired in parallel with bulb B and this combination is wired in series with bulb C. What would happen to the brightness of the other two bulbs if bulb A were to burn out?
    - Only bulb B would get brighter.
    - Both A and B would get brighter.
    - Bulb B would get brighter and bulb C would get dimmer.
    - There would be no change in the brightness of either bulb B or bulb C.

9. A piece of aluminium of finite length is drawn or stretched such that to reduce its diameter to one fourth its original value, its resistance will become  
 (a) 256 times (b) four times (c) eight times (d) sixteen times
10. In an experiment on finding equivalent resistance of two resistors in series, four students draw up circuits. Which one is correct?



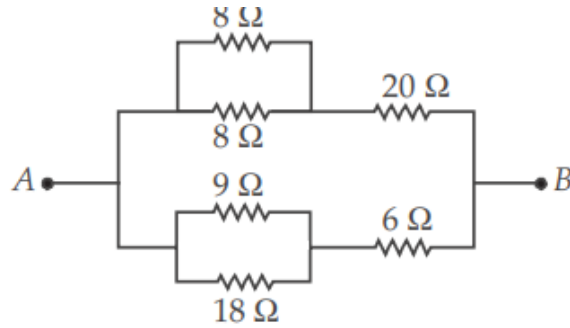
11. A cell, a resistor, a key and ammeter are arranged as shown in circuit diagrams



The current recorded in the ammeter will be

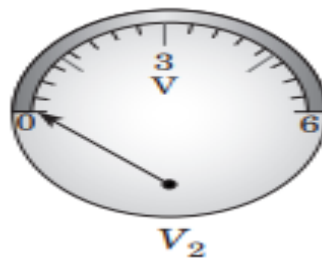
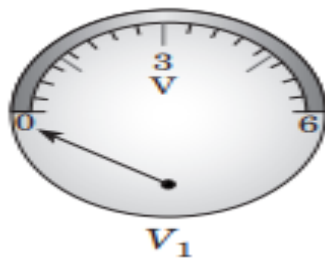
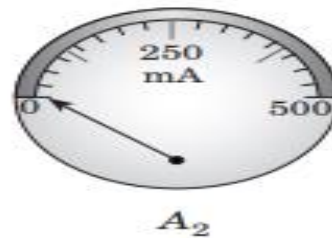
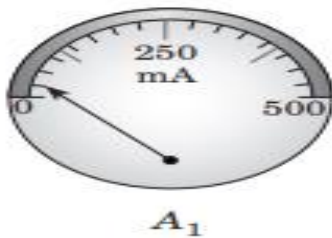
- (a) Maximum in (i) (b) maximum in (ii) (c) Maximum in (iii) (d) same
12. If a person has five resistors each of value  $1/5 \Omega$ , then the maximum resistance he can obtain by connecting them is  
 (a)  $1\Omega$  (b)  $5\Omega$  (c)  $10\Omega$  (d)  $25\Omega$
13. A charge of  $100C$  flows through a bulb in 5 minute. How much current is flowing through a bulb?  
 (a)  $500A$  (b)  $100A$  (c)  $20A$  (d)  $0.3A$
14. A metallic wire of resistance  $12\Omega$  is bent to form a square. The resistance between two diagonal points would be  
 (a)  $12\Omega$  (b)  $24\Omega$  (c)  $6\Omega$  (d)  $3\Omega$
15. When three resistors are connected in series with a battery of voltage  $V$  and voltage drop across resistors is  $V_1$ ,  $V_2$ , and  $V_3$ , which of the relation is correct?  
 (a)  $V = V_1 = V_2 = V_3$   
 (b)  $V = V_1 + V_2 + V_3$   
 (c)  $V_1 + V_2 + V_3 = 3V$   
 (d)  $V > V_1 + V_2 + V_3$

16. The equivalent resistance between the points A and B in the given below circuit



- (a)  $6\Omega$  (b)  $8\Omega$  (c)  $16\Omega$  (d)  $24\Omega$

17. The normal positions of the pointers of the two ammeters A1 and A2, and two voltmeters V1 and V2 available in the laboratory are shown in figure. For verifying Ohm's law the student should select



- (a) Ammeter A1 and Voltmeter V1 (b) Ammeter A1 and Voltmeter V2  
 (c) Ammeter A2 and Voltmeter V1 (d) Ammeter A2 and Voltmeter V2

18. A current of 4.8 A is flowing in a conductor. The number of electrons passing per second through the conductor will be

- (a)  $3 \times 10^{20}$  (b)  $76.8 \times 10^{20}$  (c)  $7.68 \times 10^{-19}$  (d)  $3 \times 10^{19}$

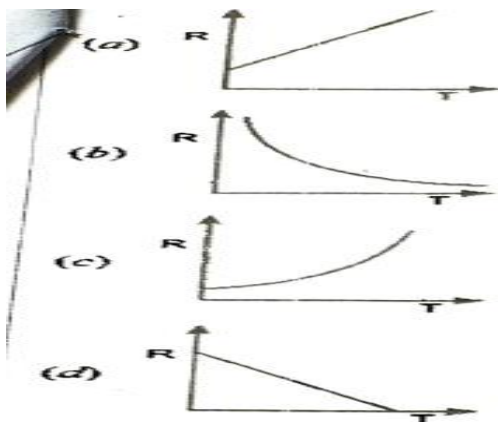
19. Suppose five resistances, each of 10 ohm are provided to you. You are free to get the desired value by combining them. The desired value will lie in between

- (a) 2 ohm to 50 ohm (b) 20 ohm to 40 ohm (c) 12 ohm to 50 ohm (d) 10 ohm to 60 ohm

20. A multimeter is used to measure

- (a) current only (b) resistance only (c) voltage only (d) current, resistance and voltage.

21. Name a device that helps to maintain potential difference across a conductor  
 (a) Volt metre (b) Battery (c) Ammeter (d) Resistor
22. Which of the following terms does not represent electric power in a circuit  
 (a)  $iR$  (b)  $i^2R$  (c)  $Vi$  (d)  $V^2/R$
23. A piece of wire of resistance  $R$  is cut into 3 equal parts. These parts are connected in parallel. If equivalent resistance of combination is  $r$ . Then the ratio  $R/r$  is  
 (a)  $Rr$  (b)  $9Rr$  (c) 9 (d) 0
24. A bulb is rated 220V, 100W. When it is operated on 110V. The power consumed will be  
 (a) 100W (b) 50W (c) 25W (d) 200W
25. Two bulbs of power 100W, 40W are connected in series. The current through 100W bulb is 2A. The current through 40W bulb will be  
 (a) 4A (b) 1A (c) 2.5A (d) 2A
26. An electric kettle consumes 1KW electric power when operated at 220V. A fuse wire of what rate must be used for it  
 (a) 1A (b) 2A (c) 4A (d) 5A
27. The temperature of a conductor is increased. Which of the following graph shows the variation of resistance with temperature



28. A wire of length  $l$ , made of material resistivity  $\rho$  is cut into two equal parts. The resistivity of each part is equal to,  
 (a)  $\rho$  (b)  $\rho/2$  (c)  $2\rho$  (d)  $4\rho$
29. Three resistances of 2, 3 and 5 ohm are connected in parallel to a 10 V battery of negligible internal resistance. The potential difference across the 3 ohm resistance will be:  
 (a) 2V (b) 3V (c) 5V (d) 10V
30. The unit of Electric power may also be expressed as  
 (a) Volt-ampere (b) Kilowatt-hour (c) Watt-second (d) Ohm-second
31. A battery of 10V carries 20,000C charge through a resistance  $20\Omega$ , the work done in 10seconds is  
 (a)  $2 \times 10^3 J$  (b)  $2 \times 10^5 J$  (c)  $2 \times 10^4 J$  (d)  $2 \times 10^2 J$
32. Two devices are connected between two points in parallel. The physical quantity that remains same between two points is  
 (a) Current (b) Voltage (c) Resistance (d) None
33. In a metallic conductor, electric current is due to the movement of

- (a) Protons                      (b) Electrons                      (c) Neutrons                      (d) Ions
34. When three resistors of each resistance  $R$  are connected in series. The equivalent resistance is  
 (a)  $R/2$                       (b) more than  $R$                       (c) less than  $R$                       (d)  $R$
35. When 4V battery is connected to an unknown resistor, carries a current of 100mA in the circuit. The value of resistor is  
 (a)  $4\Omega$                       (b)  $4000\Omega$                       (c)  $40\Omega$                       (d)  $0.4\Omega$

### **ASSERTION & REASONING QUESTIONS**

A statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices:

- a) Both assertion and reason are true, and reason is correct explanation of the assertion.  
 b) Both assertion and reason are true, but reason is not the correct explanation of the assertion.  
 c) Assertion is true, but reason is false.  
 d) Assertion is false, but reason is true
36. Assertion: The connecting wires are made of copper.  
Reason: The electrical conductivity of copper is high.
37. Assertion: A bird perches on a high power line and nothing happens to the bird.  
Reason: The circuit is incomplete for the bird sitting on high power line.
38. Assertion: The coil of a heater is cut into two equal halves and only one of them is used into heater. The heater will now require half the time to produce the same amount of heat  
Reason: The heat produced is directly proportional to square of current.
39. Assertion: A current carrying wire should be charged.  
Reason: The current in a wire is due to flow of free electrons in a definite direction.
40. Assertion: Electrons always move from a region of lower potential to a region of higher potential.  
Reason: Electron has a negative charge.
41. Assertion: It is advantageous to transmit electric power at high voltage.  
Reason: High voltage implies high current.
42. Assertion: Good conductors of heat are also good conductors of electricity and vice versa.  
Reason: Mainly electrons are responsible for conduction.
43. Assertion: If 10 bulbs are connected in series and one bulb fused, then the remaining 9 bulbs will not work.  
Reason: Bulb of higher wattage will give less bright light
44. Assertion: The 200 W bulbs glows with more brightness than 100 W bulbs.  
Reason: A 100 watt bulb has more resistance than a 200 W bulb.
45. Assertion: A voltmeter and ammeter can be used together to measure resistance and power.  
Reason: Power and resistance can be calculated from voltage and current.
46. Assertion: Longer wires have greater resistance and smaller resistance have lesser resistance  
Reason: Resistance is inversely proportional to the length of the wire

47. **Assertion:** Alloys are commonly used in electrical heating devices, like electrical iron, toasters etc.  
**Reason:** Alloys do not oxidise (burn) readily at high temperatures
48. **Assertion:** A cell is a device which converts chemical energy into electrical energy  
**Reason:** Cell maintains constant potential difference between its terminals for a long time

### CASE BASED QUESTIONS

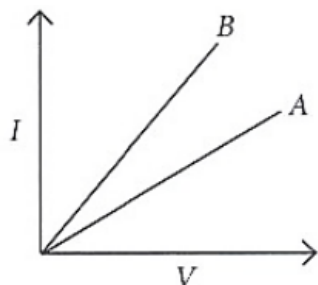
Read the passage given below and answer the following questions.

49. Several resistors may be combined to form a network. The combination should have two end points to connect it with a battery or other circuit elements. When the resistances are connected in series, the current in each resistance is same but the potential difference is different in each resistor. When the resistances are connected in parallel, the voltage drop across each resistance is same but the current is different in each resistor.

i). The household circuits are connected in

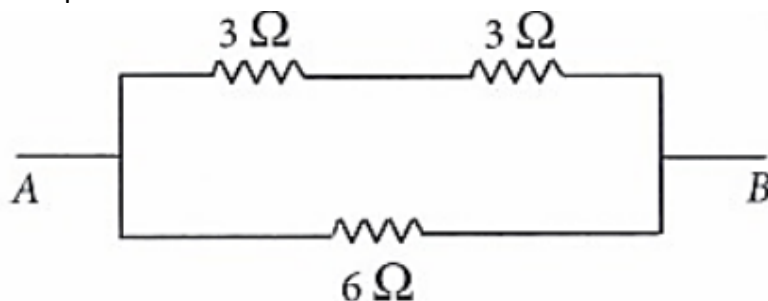
- (a) series combination (b) parallel combination (c) both (a) and (b) (d) none of these

ii). The two wires of each of resistance  $R$ , initially connected in series and then in parallel. In the graph it shows the resistance in series and in parallel. Which of the following is correct



- (a) A denotes parallel combination. (b) B denotes series combination.  
(c) A denotes series combination and B denotes parallel combination.  
(d) None of these.

iii). The equivalent resistance between A and B is



- (a)  $6 \Omega$  (b)  $9 \Omega$  (c)  $3 \Omega$  (d)  $12 \Omega$

iv). Identify the combination which is not a series connection.

- (a) Fuses (b) Decorative bulbs (c) Domestic appliance (d) Both a and c

50. The heating effect of current is obtained by transformation of electrical energy in heat energy. Just as mechanical energy used to overcome friction is converted into heat, in the same way, electrical energy



is converted into heat energy when electric current flows through a resistance wire. The heat produced in a conductor, when a current flows through it is found to depend directly on (a) strength of current (b) resistance of the conductor (c) time for which the current flows. The electrical fuse, electrical heater, electric iron, electric geyser etc. all are based on the heating effect of current.

**i).** What are the properties of heating element?

- (a) High resistance, high melting point      (b) Low resistance, high melting point  
 (c) High resistance, low melting point      (d) Low resistance, low melting point.

**ii).** What are the properties of electric fuse?

- (a) Low resistance, low melting point      (b) High resistance, high melting point.  
 (c) High resistance, low melting point      (d) Low resistance, high melting point

**iii).** When the current is doubled in a heating device and time is halved, the heat energy produced is

- (a) doubled      (b) halved      (c) four times      (d) one fourth times

**iv).** The amount of heat produced in a conductor is

- (a) directly proportional to the current flowing through it  
 (b) inversely proportional to the current flowing through it  
 (c) directly proportional to the square of the current flowing through it  
 (d) inversely proportional to the square of current flowing through it.

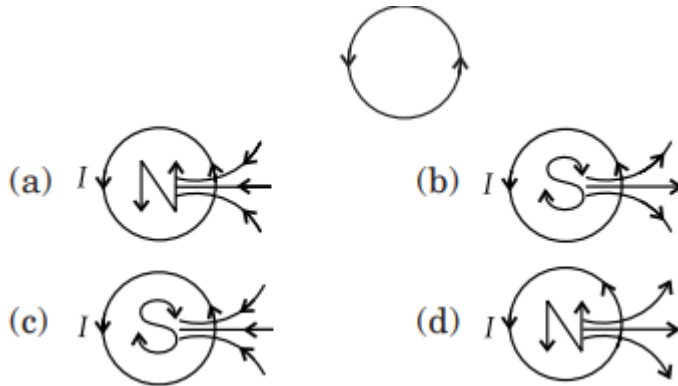
**ANSWERS**

| Q NO | Ans | Q NO | Ans | Q NO | Ans | Q NO | Ans | Q NO | Ans        |
|------|-----|------|-----|------|-----|------|-----|------|------------|
| 1.   | C   | 11.  | D   | 21.  | B   | 31.  | B   | 41.  | C          |
| 2.   | C   | 12.  | A   | 22.  | A   | 32.  | B   | 42.  | A          |
| 3.   | C   | 13.  | D   | 23.  | C   | 33.  | B   | 43.  | B          |
| 4.   | A   | 14.  | D   | 24.  | C   | 34.  | B   | 44.  | A          |
| 5.   | C   | 15.  | B   | 25.  | D   | 35.  | C   | 45.  | A          |
| 6.   | C   | 16.  | B   | 26.  | D   | 36.  | A   | 46.  | C          |
| 7.   | A   | 17.  | D   | 27.  | A   | 37.  | A   | 47.  | A          |
| 8.   | C   | 18.  | D   | 28.  | A   | 38.  | B   | 48.  | B          |
| 9.   | A   | 19.  | A   | 29.  | D   | 39.  | D   | 49.  | B, A, C, C |
| 10.  | C   | 20.  | D   | 30.  | A   | 40.  | A   | 50.  | A, C, A, C |

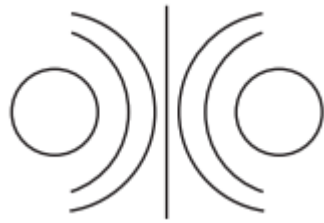
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## 12. MAGNETIC EFFECTS OF ELECTRIC CURRENT

1. A magnetic field exerts no force on:
  - (a) a stationary electric charge
  - (b) a magnet
  - (c) an electric charge moving perpendicular to its direction
  - (d) an un magnetised iron bar
2. At the centre of a magnet, the magnetism is:
  - (a) zero
  - (b) same as at the poles
  - (c) maximum
  - (d) minimum.
3. If a circular loop carries current  $I$ , then the direction of the magnetic field at the centre with the help of magnetic lines of force will be:

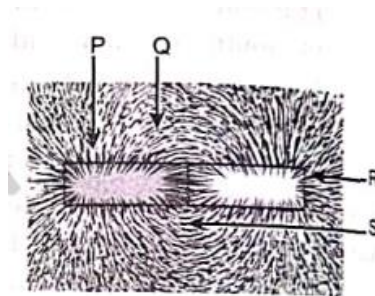


4. Which of the following instruments works by electromagnetic induction?
  - (a) Dynamo
  - (b) Moving coil galvanometer
  - (c) Telephone receiver
  - (d) Simple motor
5. The magnetic field lines due to a straight wire carrying a current are:
  - (a) Straight
  - (b) Circular
  - (c) Parabolic
  - (d) Elliptical
6. The strength of magnetic field inside a long current carrying straight solenoid is:
  - (a) More at the ends than at the centre
  - (b) minimum in the middle
  - (c) same at all points
  - (d) found to increase from one end to the other
7. The North-South polarities of an electro magnet can be found easily by using:
  - (a) Fleming's right hand rule
  - (b) Fleming's left hand rule
  - (c) Clock face rule
  - (d) Left hand thumb rule
8. A soft iron bar is introduced inside a current carrying solenoid. The magnetic field inside the solenoid
  - (a) will increase
  - (b) will remain unaffected
  - (c) will become zero
  - (d) will decrease.
9. Which of the following does not exert any force when kept in uniform magnetic field?
  - (a) Moving magnet
  - (b) Moving charge
  - (c) Stationary magnet
  - (d) Stationary charge
10. For making a strong electromagnet, the material of the core should be
  - (a) brass
  - (b) laminated steel strips
  - (c) soft iron
  - (d) steel
11. The diagram given below represents magnetic field caused by a current carrying conductor which is



(a) a long straight wire (b) a circular coil (c) a solenoid (d) a short straight wire

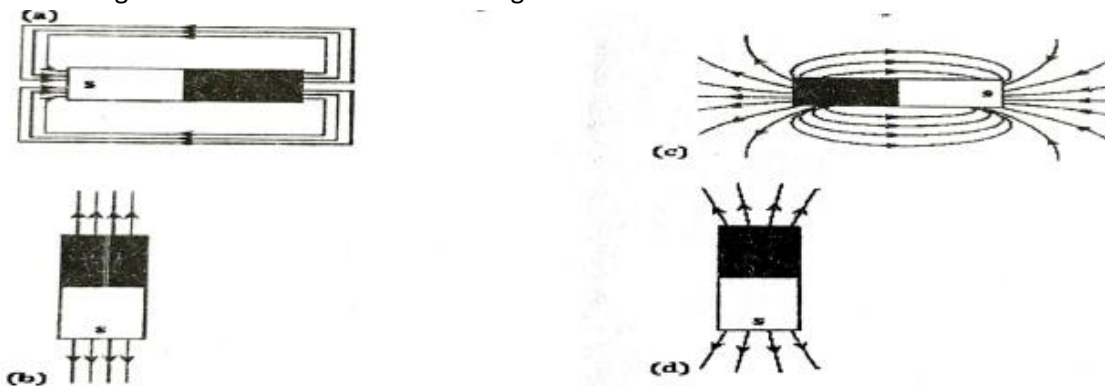
12. Magnetic field is produced by the flow of current in a straight wire. This phenomenon was discovered by  
 (a) Coulomb (b) Oersted (c) Faraday (d) Maxwell
13. An electric motor is a device which transform:  
 (a) mechanical Energy to electrical energy (b) heat energy to electrical energy  
 (c) electrical energy to heat energy (d) electrical energy to mechanical energy
14. A student places some iron fillings around a magnet. The iron fillings arrange themselves as shown in image. The student labelled four different regions around the magnet. Where would be the magnetic field the strongest?



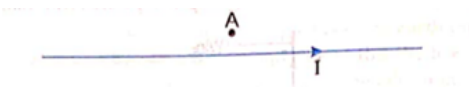
(a) S (b) R (c) Q (d) P

15. The direction of the force on a current carrying wire placed in a magnetic field depends on:  
 (a) the direction of the current but not on the direction of the field  
 (b) the direction of the field but not on the direction of the current  
 (c) the direction of the current as well as the direction of the field  
 (d) neither the direction of the current nor the direction of the field
16. The strength of magnetic field inside a long current carrying straight solenoid is:  
 (a) more at the ends than at the centre  
 (b) minimum in the middle  
 (c) same at all points  
 (d) found to increase from end to the other
17. According to international convention of colour coding in a wire  
 (a) live is red, neutral is black and earth is green  
 (b) live is brown, neutral is blue and earth is green  
 (c) live is brown, neutral is green and earth is black  
 (d) live is red, neutral is yellow, and earth is blue
18. A fuse wire is made up of Tin-Copper alloy because  
 (a) has low melting point (b) high melting point (c) high boiling point (d) none

19. At the time of short circuit, the current in the circuit  
 (a) Reduces (b) zero (c) increases heavily (d) vary continuously
20. Appliances that have metal body are generally connected to earthing wire because  
 (a) To prevent excess of current (b) To prevent leakage of current  
 (c) To provide extra current (d) To provide high resistance
21. A student learns that magnetic field strength around a bar magnet is different at every point. Which diagram shows the correct magnetic field lines around a bar magnet?



22. A stream of positively charged alpha particles moving towards west is deflected towards north by a magnetic field. The direction of magnetic field is:  
 (a) towards south (b) towards east (c) downward (d) upward
23. Two magnetic field lines  
 (a) Intersect at neutral point (b) Never intersect (c) Intersect near poles (d) none
24. The magnetic field produced due to circular wire at its centre is:  
 (a)  $45^\circ$  to the plane of the wire (b)  $60^\circ$  to the plane of the wire  
 (c) in the plane of the wire (d)  $90^\circ$  to the plane of the wire
25. A rectangular coil of copper wire is rotated in a magnetic field. The direction of induced current changes once in each  
 (a) two revolutions (b) one revolution (c) half revolution (d) four revolutions
26. For a current in long straight solenoid N and S poles are created at the two ends. Among the following statements, the incorrect one is:  
 (a) The field lines inside the solenoid are in the form of straight lines which indicate that the field lines is same at all points in the solenoid  
 (b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material, when soft iron is placed inside the coil  
 (c) The pattern of magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet  
 (d) The N and S poles exchange positions when the direction of current through the solenoid is reversed
27. A current through a horizontal power line flows in east to west direction. The direction of magnetic field at a point directly below it is from  
 (a) North to south (b) South to North (c) West to east (d) North to west
28. What is the direction of magnetic field at a point A above the wire carrying current I as shown in the figure



- (a) Out of page                      (b) into the page                      (c) Up the page                      (d) Down the page

29. Magnetic force acting on a charged particle placed in uniform magnetic field is maximum when  
 (a) charged particle velocity is zero                      (b) angle between charge and field is 90 degrees  
 (c) field is zero                      (d) none
30. Which of the following properties of a proton can change while it moves freely in a magnetic field  
 (a) Mass                      (b) Speed                      (c) Momentum                      (d) Kinetic energy

**ASSERTION & REASONING BASED MCQS FOR QUESTION**

A statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices:

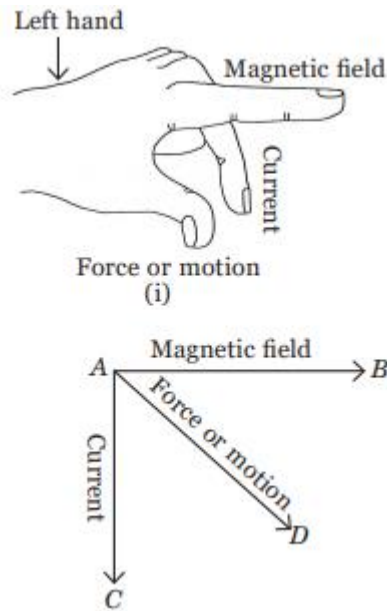
- e) Both assertion and reason are true, and reason is correct explanation of the assertion.  
 f) Both assertion and reason are true, but reason is not the correct explanation of the assertion.  
 g) Assertion is true, but reason is false.  
 h) Assertion is false, but reason is true
31. Assertion: Magnetic field lines show the direction (at every point) along which a small magnetised needle aligns (at the point).  
Reason: Magnetic field lines certainly represent the direction of magnetic field, but not the direction of force, this is because force is always perpendicular to magnetic field B.
32. Assertion: Magnetic field interacts with a moving charge and not with a stationary charge.  
Reason: A moving charge produces a magnetic field.
33. Assertion: No net force acts on a rectangular coil carrying a steady current when suspended freely in a uniform magnetic field.  
Reason: Forces acting on each pair of the opposite sides of the coil are equal and opposite.
34. Assertion: In a conductor, free electrons keep on moving but no magnetic force acts on a conductor in a magnetic field.  
Reason: Force on free electron due to magnetic field always acts parallel to its direction of motion.
35. Assertion: The magnetic field produced by a current carrying solenoid is independent of its length and cross sectional area.  
Reason: The magnetic field inside the solenoid is uniform.
36. Assertion: In electric circuits, wires carrying currents in opposite directions are often twisted together.  
Reason: If the wire is not twisted together, the combination of the wires forms a current loop. The magnetic field generated by the loop might affect adjacent circuits or components.

37. Assertion: The magnetic field intensity at the centre of a circular coil carrying current changes, if the current through the coil is doubled.  
Reason: The magnetic field intensity is dependent on current in conductor.
38. Assertion: For a point on the axis of a circular coil carrying current, magnetic field is maximum at the centre of the coil.  
Reason: Magnetic field is proportional to the distance of point from the circular coil.
39. Assertion: When two long parallel wires, hanging freely are connected in parallel to a battery, they come closer to each other.  
Reason: Wires carrying current in opposite directions repel each other.
40. Assertion: The magnetic field is stronger at a point which is nearer to the conductor and goes on decreasing on moving away from the conductor.  
Reason: A magnetic field produced by a straight current carrying wire is inversely proportional to the distance from the wire.
41. Assertion: A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the magnitude of the current in the wire is increased.  
Reason: The strength of a magnetic field at a point near the conductor increases on increasing the current.
42. Assertion: The strength of the magnetic field produced by a current carrying circular coil increases on increasing the current flowing through the coil.  
Reason: Magnetic field strength is inversely proportional to the current flowing in the coil.
43. Assertion: When electric current is passed through a wire, magnetic needle kept near to wire shows deflection.  
Reason: Magnets have two poles.
44. Assertion: The magnetic field produced by a current carrying solenoid is independent of its length and cross sectional area.  
Reason: The magnetic field inside the solenoid is uniform.
45. Assertion: The direction of force is given by Fleming's left hand rule.  
Reason: A magnetic field exert a force on a moving charge in the same direction as the direction of field itself.
46. Assertion: No net force acts on a rectangular coil carrying a steady current when suspended freely in a uniform magnetic field.  
Reason: Forces acting on each pair of the opposite sides of the coil are equal and opposite.
47. Assertion: In electric circuits, wires carrying currents in opposite directions are often twisted together.  
Reason: If the wires are not twisted together, the combination of the wires forms a current loop. The magnetic field generated by the loop might affect adjacent circuits or components.

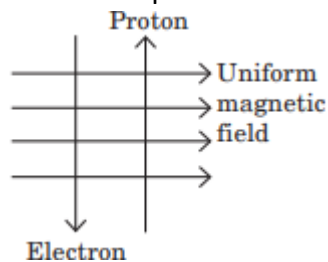
## CASE BASED QUESTIONS

Read the passage given below and answer the following questions.

48. Electric Charges moving in a magnetic field experience a force, while there is no such force on static charges. This fact was first recognized by Hendrik Antoon Lorentz, a great Dutch physicist, nearly a century ago. Thus, a charge moving in a magnetic field experience a force, except when it is moving in a direction parallel to it. The magnitude of force experienced depends on the charge, velocity ( $v$ ), strength of magnetic field ( $B$ ), and sine of the angle between  $v$  and  $B$ . If the direction of velocity is perpendicular to the direction of magnetic field, direction of magnetic force is given by Fleming's left hand rule.

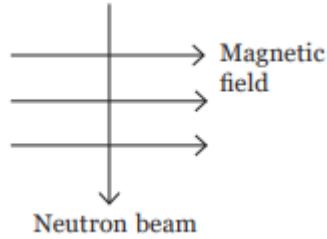


- i). If an electron is travelling horizontally towards east. A magnetic field in vertically downward direction exerts a force on the electron along  
 (a) east                      (b) west                      (c) north                      (d) south.
- ii). If a charged particle is moving along a magnetic field line. The magnetic force on the particle is  
 (a) along its velocity      (b) opposite to its velocity      (c) perpendicular to its velocity      (d) zero.
- iii). A uniform magnetic field exists in the plane of paper pointing from left to right as shown in figure. In the field an electron and a proton move as shown. The electron and the proton experience



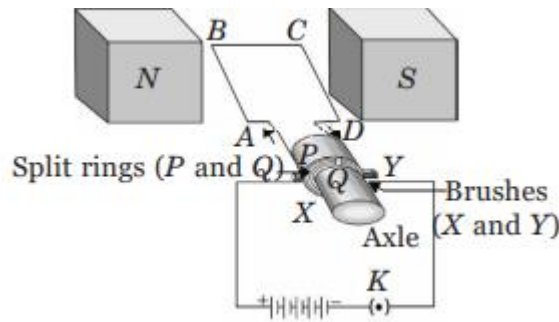
- (a) forces both pointing into the plane of paper.      (b) forces both pointing out of the plane of paper.  
 (c) forces pointing into the plane of paper and out of the plane of paper, respectively.  
 (d) force pointing opposite and along the direction of the uniform magnetic field respectively.

iv). A neutron beam enters a magnetic field at right angles to it as shown in the figure. Due to magnetic field, neutron beam will deflect



- (a) to the left                      (b) to the right                      (c) into the page                      (d) no deflection.

49. An electric motor is a rotating device that converts electrical energy into mechanical energy. Electric motor is used as an important component in electric fans, refrigerators, mixers, washing machines, computers, MP3 players, etc.

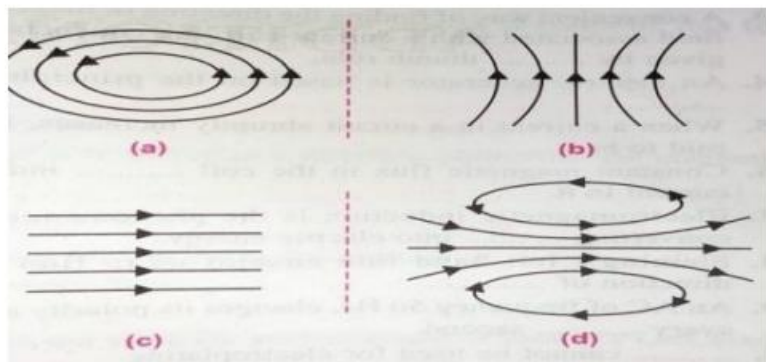


An electric motor consists of a rectangular coil ABCD of insulated copper wire. The coil is placed between the two poles of a magnetic field such that the arm AB and CD are perpendicular to the direction of the magnetic field. The ends of the coil are connected to the two halves P and Q of a split ring. The inner sides of these halves are insulated and attached to an axle. The external conducting edges of P and Q touch two conducting stationary brushes X and Y, respectively, as shown in the figure. Commercial motors use an electromagnet in place of a permanent magnet.

- i). Choose incorrect statement from the following regarding split rings.
- (a) Split rings are used to reverse the direction of current in coil.  
 (b) Split rings are also known as commutator.  
 (c) Split ring is a discontinuous or a broken ring.  
 (d) Both (a) and (b)
- ii). Which of the following has no effect on the size of the turning effect on the coil of an electric motor?
- (a) The amount of the current in the coil.                      (b) The direction of the current in the coil.  
 (c) The number of turns in the coil.                              (d) The strength of the magnetic field.
- iii). When current is switched ON, an electric fan converts
- (a) mechanical energy to chemical energy                      (b) electrical energy to mechanical energy  
 (c) chemical energy to mechanical energy                      (d) mechanical energy to electrical energy.
- iv). In an electric motor, device that makes contact with the rotating rings and through them current is supplied to coil is
- (a) axle                      (b) brushes                      (c) coil                      (d) split rings.



50. The phenomenon of generation of an electric current in a circuit from magnetic effects, i.e., by changing the magnetic flux linked with it is called electromagnetic induction. This phenomenon is widely used to construct generation which produces large scale electric power for domestic and industrial use.



- i).** The magnetic field represented by above figure is due to:  
 (a) A source of uniform magnetic field      (b) A source of non-uniform magnetic field  
 (c) A bar magnet      (d) A straight current-carrying conductor
- ii).** The magnetic field represented by Figure (b) is/due to:  
 (a) A circular coil      (b) A solenoid      (c) Uniform      (d) A straight conductor
- iii).** The magnetic field represented by Figure (c) is/due to:  
 (a) A bar magnet      (b) Non-uniform magnetic field  
 (c) A straight current-carrying conductor      (d) Uniform magnetic field
- iv).** The magnetic field lines represented Figure (d) is due to:  
 (a) A straight current-carrying conductor      (b) A circular coil  
 (c) A solenoid      (d) A source of uniform magnetic field

### ANSWERS

| Q NO | Ans | Q NO | Ans | Q NO | Ans | Q NO | Ans | Q NO | Ans        |
|------|-----|------|-----|------|-----|------|-----|------|------------|
| 1.   | A   | 11.  | B   | 21.  | C   | 31.  | B   | 41.  | D          |
| 2.   | A   | 12.  | B   | 22.  | D   | 32.  | A   | 42.  | C          |
| 3.   | D   | 13.  | D   | 23.  | B   | 33.  | A   | 43.  | B          |
| 4.   | A   | 14.  | B   | 24.  | D   | 34.  | C   | 44.  | B          |
| 5.   | B   | 15.  | C   | 25.  | C   | 35.  | B   | 45.  | C          |
| 6.   | C   | 16.  | C   | 26.  | C   | 36.  | A   | 46.  | A          |
| 7.   | D   | 17.  | B   | 27.  | A   | 37.  | A   | 47.  | A          |
| 8.   | A   | 18.  | A   | 28.  | A   | 38.  | C   | 48.  | D, D, A, D |
| 9.   | D   | 19.  | C   | 29.  | B   | 39.  | B   | 49.  | D, B, B, B |
| 10.  | C   | 20.  | B   | 30.  | C   | 40.  | B   | 50.  | D, A, D, C |

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## 13-OUR ENVIRONMENT

1. Which of the following are the correct terms used for the group of organisms mentioned below?
  1. Grass, Fern, Moss
  2. Lion, Cow, Rat
  3. Bacteria, Fungi  
  - a) 1- carnivores, 2-herbivores, 3- saprophytes
  - b) 1- herbivores, 2- decomposers, 3- parasites
  - c) 1- producers, 2- consumers, 3- decomposers
  - d) 1- decomposers, 2- producers, 3- consumers
2. A food web is formed by
  - a) interconnections of different ecosystems
  - b) interconnections of different food chains
  - c) interconnections of different species
  - d) interconnections of nutrient cycles
3. Nowadays, the usage of bioplastics is promoted more than ordinary plastics because
  - a) All bioplastics are biodegradable or compostable.
  - b) Bioplastics break down under the influence of natural elements.
  - c) Compostable products can be turned into compost within six months.
  - d) All the above options are correct.
4. In a particular food chain, if the energy produced by the autotrophs is 1000 Kcal, then the amount of energy which reaches fourth trophic level is:
  - a) 100 kcal
  - b) 0.01 kcal
  - c) 1 kcal
  - d) 0.1 cal
5. Which of the following is a correct reason for the assertion that "pesticides are said to move up the food chain"?
  - a) Pesticides have a greater effect on larger animals than on insects.
  - b) Top predators often accumulate the pesticides contained in the bodies of their prey.
  - c) Birds and predatory mammals are not affected by pesticides.
  - d) Pesticides kill insects and other target pests before they can absorb the poison.
6. The major cause for depletion of ozone layer in stratosphere can be attributed to:
  - a) Increase in the level of greenhouse gases
  - b) Increased release of CFCs
  - c) Decreased release of CFCs
  - d) Increase in sulphur dioxide and carbon monoxide
7. Which of the following statement(s) is/are correct? Statement 1: Biodegradable waste consists of plastic materials, metal scraps, aluminum cans and bottles, etc.  
Statement 2: Plastic materials decomposes soon and eventually mixes or returns back to the soil.
  - a) Only Statement 1 is true.
  - b) Only Statement 2 is true.

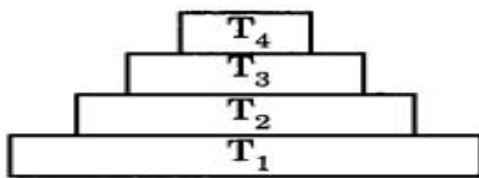
- c) Both Statement 1 and Statement 2 are true.
  - d) Both Statement 1 and Statement 2 are false.
8. Which statement shows the interaction of an abiotic component with a biotic component in an ecosystem?
- a) A grasshopper feeding on a leaf
  - b) Rainwater running down into the lake
  - c) An earthworm making a burrow in the soil
  - d) A mouse fighting with another mouse for food
9. Which of the following are environment-friendly practices?
- a) Carrying a cloth bag to put purchases while shopping.
  - b) Switching off unnecessary lights and fans
  - c) Walking to school instead of getting your mother to drop you on her scooter
  - d) All of the above
10. The manufacturing of Chlorofluorocarbons free refrigerators is mandatory throughout the world. How does this help prevent ozone depletion?
- a) This will help convert oxygen molecules into ozone
  - b) This will help convert the CFCs into ozone molecules
  - c) This will reduce the production of CFCs from oxygen molecules
  - d) This will reduce the release of CFCs that reacts with ozone molecules
11. Ozone forms by the combination of free oxygen atoms and oxygen molecules. How do free oxygen atoms form at higher levels of the atmosphere?
- a) By splitting molecular oxygen into free oxygen atoms in the presence of low-energy UV radiations.
  - b) By splitting molecular oxygen into free oxygen atoms in the presence of high-energy UV radiations.
  - c) By the combination of two molecular oxygen in the presence of high energy UV radiations
  - d) By the combination of two free oxygen atoms in the presence of lower energy UV radiations
12. Environment includes
- a) Land, air, water
  - b) Light, temperature, rainfall
  - c) Plants, animals, microbes
  - d) All of these
13. What is the order of the waste management hierarchy, from most to least favoured?
- a) Prevention-Recycle-Reuse-Disposal
  - b) Prevention-Reuse-Disposal-Recycle
  - c) Prevention-Disposal-Reuse-Recycle
  - d) Prevention-Reuse-Recycle-Disposal
14. An environment-friendly practice is
- a) Using CFLs at homes and offices
  - b) Using the car to go to nearby places

- c) Using AC in every room
  - d) Burning plastics
15. Which of the following limits the number of trophic levels in a food chain?
- a) Water
  - b) Polluted air and water
  - c) Deficient food supply
  - d) Decrease in energy at higher trophic levels
16. The biotic components of an ecosystem consist of
- a) Plants and animals
  - b) Algae and fungi
  - c) Producers, consumers & decomposers
  - d) Air, water, soil
17. **The harmful chemical which is accumulating in human beings through the food chain is**
- a) BHC
  - b) DDT
  - c) Abscisic acid
  - d) CFC
18. **Which of the following constitutes a food chain?**
- a) Grass, goat and human
  - b) Goat, cow and elephant
  - c) Grass, fish and zebra
  - d) Grass, wheat and apple
19. **Which of the following statement regarding recycling is wrong?**
- a) Saves precious resources
  - b) Require stable market
  - c) Improves efficiency of treatment processes
  - d) Increases the need for mining virgin materials
20. **What will happen if deer is missing from the food chain: grass → deer → Tiger?**
- a) the population of tiger will increase
  - b) tiger will start eating grass
  - c) the population of grass decrease
  - d) population of tiger decrease and grass increases
21. **Which option is incorrect:**
- a) all green plants and blue green algae are producers
  - b) green plants get their food from organic compounds
  - c) producers prepare food from inorganic substances
  - d) plants convert solar energy to chemical energy
22. **If a grasshopper is eaten by frog, then the energy transfer will be from :**
- a) producers to decomposers
  - b) producer to primary consumer

- c) primary consumer to secondary consumer
  - d) secondary consumer to primary consumer
23. **The organisms of higher trophic level which feed on several types of organisms belonging to lower trophic level, constitute the**
- a) food web
  - b) ecological pyramid
  - c) ecosystem
  - d) food chain
24. **In a given food chain the amount of energy at fourth trophic level is 5 KJ, what will be the energy at producer level?**
- a) 5KJ
  - b) 50KJ
  - c) 500kJ
  - d) 5000KJ
25. **In trophic level, the greatest number is of \_\_\_\_\_.**
- a) Producers
  - b) Primary consumers
  - c) Secondary consumers
  - d) Tertiary consumers
26. **Following is true for food web:**
- a) The energy available at each level gets diminished
  - b) Energy moves progressively through different levels
  - c) a and b
  - d) none
27. **Order of energy flow in ecosystem is:**
- a) Sunlight → Herbivores → producers → carnivores
  - b) Sunlight → producers → carnivores → herbivores
  - c) Sunlight → herbivores → carnivores → producers
  - d) Sunlight → producers → herbivores → carnivores
28. **Which statement is incorrect:**
- a) All green plants and blue green algae are producers
  - b) Green plants get their food from organic compounds
  - c) Producers prepare their own food from inorganic compounds
  - d) Plants convert solar energy into chemical energy
29. **Which of the following belongs to the category of primary consumers?**
- a) Eagle and snake
  - b) Grasshopper and cattle
  - c) Snake and frog
  - d) Water beetles and fish
30. **Which of the two sets belongs to the same trophic level?**
- a) Rabbit: Tiger
  - b) Vulture: Rat

- c) Grasshopper: Hawk  
d) Frog: Lizard
31. Which of the following is the best way for disposal of vegetable and fruit peels?  
a) Landfill  
b) Recycling  
c) Composting  
d) Burning
32. Excessive exposure of humans to UV-rays results in  
i) damage to immune system  
ii) damage to lungs  
iii) skin cancer  
iv) peptic ulcers
- a) i and ii  
b) i and iv  
c) i and iii  
d) iii and iv
33. Which group of organisms are not the constituents of a food chain?  
i) Grass, lion, rabbit, wolf  
ii) Plankton, man, fish, grasshopper  
iii) Wolf, grass, snake, tiger  
iv) Frog, snake, eagle, grass, grasshopper
- a) i and iii  
b) iii and iv  
c) ii and iii  
d) i and iv
34. Disposable plastic plates should not be used because  
a) they are made of materials with light weight  
b) they are made of toxic materials  
c) they are made of biodegradable materials  
d) they are made of non-biodegradable materials
35. Which is incorrect:  
a) all green plants and blue green algae are producers  
b) green plants get their food from organic compounds  
c) producers prepare food from inorganic substances  
d) plants convert solar energy to chemical energy
36. The problem caused due to ozone hole is  
a) earthquakes  
b) damage due to UV radiations  
c) chemical pollution  
d) acid rain

37. By which way autotrophs convert energy of food?
- Solar energy to chemical energy
  - Bio-gas to chemical energy
  - solar energy to bio-gas
  - Chemical energy to solar energy
38. Accumulation of non-biodegradable pesticides in the food chain in increasing amount at each higher trophic level is known as:
- Eutrophication
  - Pollution
  - Biomagnifications
  - Accumulation
39. In the given Figure the various trophic levels are shown in a pyramid. At which trophic level is maximum energy available?



- T4
  - T2
  - T1
  - T3
40. If a grasshopper is eaten by frog, then the energy transfer will be from:
- producers to decomposers
  - producer to primary consumer
  - primary consumer to secondary consumer
  - secondary consumer to primary consumer

**ASSERTION (A) AND REASON (R)**

The following questions are Assertion-Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- Both A and R are true and R is the correct explanation of A.
- Both A and R are true but R is not the correct explanation of A.
- A is true but R is false.
- A is false but R is true.

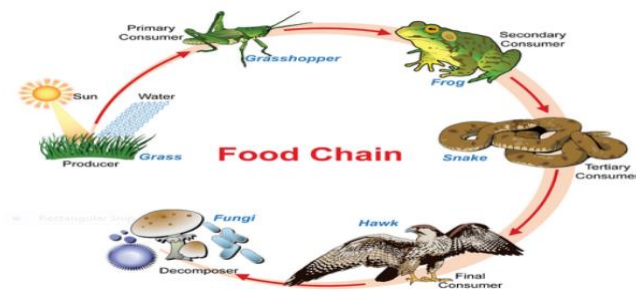
41. **Assertion:** The concentration of harmful chemicals is more in human beings.  
**Reason:** Man is at the apex of the food chain.
42. **Assertion:** Abiotic component of an ecosystem involves cycling of material and flow of energy.  
**Reason:** This is essential to keep biotic factors alive.
43. **Assertion:** First trophic level in a food chain is always a green plant.  
**Reason:** Green plants are called producers.
44. **Assertion:** Man is a herbivore.  
**Reason:** Omnivores eat both plant food and meat of animals.

45. **Assertion:** In an ecosystem, the function of producers is to convert organic compounds into inorganic compounds.  
**Reason:** Green plants, the producers, transduce solar energy.
46. **Assertion:** Trophic levels are formed by only plants.  
**Reason:** Food chains and webs are formed due to linked organisms on the basis of their nutrition.
47. **Assertion:** Herbivores are called first order consumers  
**Reason:** Tiger is a top carnivore.
48. **Assertion:** Ecology is study of relationship between living organisms and their environment.  
**Reason:** The biotic community and non-living environment of an area function together to form an ecosystem.
49. **Assertion:** Polythene bags and plastic containers are non-biodegradable substance.  
**Reason:** They can be broken down by micro-organisms in natural simple harmless substances.
50. **Assertion:** Aquatic food chain is the food chain present in water bodies.  
**Reason:** The example of aquatic food chain is phytoplankton - zooplankton - fish - shark.
51. **Assertion:** Each step or level of the food chain forms a trophic level  
**Reason:** Autotrophs or producers are the first trophic level in the ecosystem
52. **Assertion:** The length and complexity of food chain vary greatly in an ecosystem  
**Reason:** There is a reduction of energy when it transfers from one trophic level to other by eating and being eaten.
53. **Assertion:** There is generally greater number of individuals at the lower trophic levels of an ecosystem  
**Reason:** Green plants are the producers in an ecosystem
54. **Assertion:** Ozone is formed by three atoms of oxygen  
**Reason:** UV rays are needed to form ozone molecule
55. **Assertion:** Only the green plants can prepare their own food by means of photosynthesis  
**Reason:** Some Bacteria derive their nutrition by autotrophic means
56. **Assertion:** Forests, Grass lands, Rivers, Meadows, Estuaries are natural ecosystems  
**Reason:** Artificial ecosystems are manmade ecosystems
57. **Assertion:** In Sea waters the number of Primary Producers is more than that of Primary consumers.  
**Reason:** In Sea water the Primary consumers are more than that of Primary Producers
58. **Assertion:** Decomposers act as cleaning agents of environment.  
**Reason:** The decomposers recycle waste material in hydrosphere.
59. **Assertion:** Garden is an artificial ecosystem.  
**Reason:** Biotic and abiotic components are manipulated by humans.
60. **Assertion:** A network of food chains existing together in an ecosystem is known as food web  
**Reason:** An animal like kite cannot be a part of a food web.

#### CASE-BASED QUESTIONS



### Question 1:



Food chain is a sequence of organisms where nutrients and energy is transferred from one organism to the other. Each step or level of the food chain forms a trophic level. A food chain only follows just one path as animals find food. A hawk eats a snake, which has eaten a frog, which has eaten a grasshopper, which has eaten grass. A food web on the other hand shows the many different paths plants and animals are connected. As an example, hawk might also eat a mouse, a squirrel, a frog or some other animal. The snake may eat a beetle, a caterpillar, or some other animal. And so on for all the other animals in the food chain. A food web is several food chains connected together.

61. Organisms of the first trophic level belong to
  - a) Producers
  - b) consumer
  - c) Decomposers
  - d) Heterotrophs
  
62. What are animals that eat herbivores?
  - a) Producers
  - b) primary consumers
  - c) secondary consumers
  - d) tertiary consumers
  
63. What is the average value of the amount of organic matter that is present at each step and reaches the next level of consumers?
  - a) 5%
  - b) 28%
  - c) 29%
  - d) 10%
  
64. What percentage of energy do green plants capture to convert it into food energy?
  - a) 1%
  - b) 25%
  - c) 8%
  - d) 92%

### Question2:

Ozone layer depletion is the thinning of the ozone layer present in the upper atmosphere. This happens when the chlorine and bromine atoms in the atmosphere come in contact with ozone and destroy the ozone molecules. One chlorine atom can destroy 100,000 molecules of ozone. Because of the depletion of the ozone layer, humans are being exposed to the harmful ultraviolet radiations of the sun. This results in serious health issues among humans, such as skin diseases, cancer, sunburns, cataract, quick ageing and weak immune system.

65. In which sphere ozone layer depletion is found?  
 a) Ionosphere  
 b) Stratosphere  
 c) Lithosphere  
 d) None of these
66. Main cause of ozone holes and its depletion is  
 a) Propellants  
 b) Foam-blowing agents  
 c) Halocarbon refrigerants  
 d) All of these
67. What is a major risk linked with extreme ultraviolet rays through the atmosphere as a result of ozone layer depletion?  
 a) Neurological disorder  
 b) Digestive system gets damaged  
 c) Increased liver cancer  
 d) Increased skin cancer
68. CFCs are used as \_\_\_\_\_  
 a) Fuel in airplanes  
 b) Refrigerants in cooling units  
 c) Paint  
 d) All of these

**ANSWERS**

| Q No | Ans | Q No | Ans | Q No | Ans | Q No | Ans |
|------|-----|------|-----|------|-----|------|-----|
| 1    | c   | 21   | b   | 41   | a   | 61   | a   |
| 2    | b   | 22   | c   | 42   | a   | 62   | c   |
| 3    | d   | 23   | a   | 43   | a   | 63   | d   |
| 4    | c   | 24   | d   | 44   | d   | 64   | a   |
| 5    | b   | 25   | a   | 45   | a   | 65   | b   |
| 6    | b   | 26   | c   | 46   | d   | 66   | d   |
| 7    | d   | 27   | d   | 47   | b   | 67   | d   |
| 8    | c   | 28   | b   | 48   | a   | 68   | b   |
| 9    | d   | 29   | b   | 49   | c   |      |     |
| 10   | d   | 30   | d   | 50   | a   |      |     |
| 11   | b   | 31   | c   | 51   | a   |      |     |
| 12   | d   | 32   | c   | 52   | a   |      |     |
| 13   | d   | 33   | c   | 53   | b   |      |     |
| 14   | a   | 34   | d   | 54   | a   |      |     |
| 15   | d   | 35   | b   | 55   | b   |      |     |
| 16   | c   | 36   | b   | 56   | a   |      |     |
| 17   | b   | 37   | a   | 57   | b   |      |     |
| 18   | a   | 38   | c   | 58   | c   |      |     |
| 19   | d   | 39   | c   | 59   | b   |      |     |
| 20   | d   | 40   | c   | 60   | c   |      |     |

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