INTERNATIONAL SOCIETY FOR OLYMPIAD

Empowering children to become Global Olympiad Champions

Eupheus Learning

SCIENCE OLYMPIAD

PRACTICE BOOK

GRADE 10

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Preface

Our education system effectively provides an introduction to the concepts of Math and Science and helps us understand the underlying concepts. But in its overly generalized approach, which aims to enlighten and test all students of varying caliber and interests, it leaves the exploration of application of all these concepts completely on the students.

This workbook is designed to enable students to explore Science effectively. Designed in accordance with the requirements of the Science Olympiads, the workbook is an efficient tool to achieve comprehensive success at the **ISFO – Science Olympiad**.

The main aim of this workbook is to assist students in developing and improving their ability to solve problems.

Each chapter of the book consists of 3 sets of questions.

- **Section A** (Scientific Reasoning) : This section is created to test the knowledge of scientific concepts and topics pertaining to the respective grades.
- **Section B** (Everyday Science) : This section deals with the application of the concept learnt.
- **Section C** (BrainBox) : Questions to prepare students with HOTS (Higher Order Thinking Skills), based on the syllabus provided.

Logical Reasoning section is provided to equip students with verbal and non-verbal analysis and reasoning skills.

Sample Test Papers and Answer keys have been provided to accelerate the learning process.

Contents

Chapter 1

Chemical Reactions and Equations

- All chemical changes are accompanied by chemical reactions which involve chemical changes. Chemical changes involve breaking of bonds between the atoms of the reactants and formation of bonds between the atoms of the products.
  - The method of representing a chemical reaction with the help of symbols and formulae of the substances involved in it, is known as a chemical equation.
  - The chemical equations are balanced to satisfy the law of conservation of mass in chemical reactions.
  - Types of Chemical equations are combination reactions, decomposition reactions, double displacement reactions, oxidation and reduction reactions.
  - Oxidation is the process in which an atom or an ion loses one or more electrons. Reduction is the process in which an atom or an ion gains one or more electrons. An electron losing species is called a reducing agent. An electron accepting species is called an oxidising agent.

SECTION - A : SCIENTIFIC REASONING

1. The rate of a chemical reaction does not depend on –
   a. the nature of the catalyst used.
   b. change in temperature.
   c. states of the reactants.
   d. the amount of sunlight.

2. The given equation balances when

$$aK_2Cr_2O_7 + bKCl + cH_2SO_4 \rightarrow xCrO_2Cl_2 + yKHSO_4 + zH_2O$$

   a. a = 1, b = 4, c = 6 and x = 2, y = 6, z = 3
   b. a = 6, b = 4, c = 6 and x = 6, y = 3, z = 2

c. a = 4, b = 2, c = 6 and x = 6, y = 2, z = 3

d. a = 2, b = 4, c = 6 and x = 2, y = 6, z = 3

3. Which of the following reactions are endothermic in nature?

i) Evaporation of water

ii) Making an aqueous solution of sodium hydroxide

iii) Combustion of methane gas

iv) Dilution of sulphuric acid

v) Making an aqueous solution of ammonium chloride

The correct option is –

a. i), ii) and iii) b. ii) and iv)

c. i), iii) and v) d. i) and v)

4. Which of the following statement is correct?

a. Electrons are gained by the oxidising agent as it undergoes reduction.

b. Electrons are gained by the oxidising agent as it undergoes oxidation.

c. Electrons are gained by the reducing agent as it undergoes oxidation.

d. Electrons are gained by the reducing agent as it undergoes reduction.

5. In the reaction $Mg + HCl \rightarrow MgCl_2 + H_2$ magnesium acts as:

a. an oxidising agent.

b. an reducing agent.

c. an oxidising as well as a reducing agent.

d. a catalyst

6. Metal 'P' is found in the Earth's crust. By mass, it makes up about 8% of the Earth's crust. When it is exposed to air, it forms a corrosion preventive layer. It is used to make utensils. When blue coloured solution 'Q' is stored in a container made of 'P', the solution turns colourless and a reddish brown layer of 'R' is formed over the surface of 'P'.

Identify 'P', 'Q' and 'R'.

a. P – Cu, Q – $FeSO_4$ solution, R – Al

b. P – Zn, Q – $CuSO_4$ solution, R – Fe

c. P – Al, Q – $CuSO_4$ solution, R – Cu

d. P – Fe, Q – $Al_2(SO_4)_3$, R – Al

7. Which of the following reactions is not a redox reaction?

a. $ZnO + C \rightarrow Zn + CO$

b. $CuO + H_2 \rightarrow Cu + H_2O$

c. $2Cu + O_2 \rightarrow 2CuO$

d. $MnO_2 + HCL \rightarrow MnCl_2 + 2H_2O + Cl_2$

8. A balanced chemical equation always obeys

a. the law of conservation of mass.

b. the law of thermal equilibrium.

c. the law of conservation of energy.

d. All of the above

9. A solution of slaked lime is used for white washing walls. But a shiny finish to the walls is observed after 2-3 days of white washing. Which of the following chemical reaction represent this ?

a. $CaO + H_2O \rightarrow Ca(OH)_2$

b. $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

c. $CaO + CO_2 \rightarrow CaCO_3$

d. $Ca(OH)_2 + CO_2 \rightarrow CaHCO_3 + H2(\uparrow)$

10. Which of the following statement is incorrect?

a. Chips manufacturers usually flush chips bags with nitrogen gas to prevent rancidity.

b. Rancidity is prevented by adding antioxidants to food.

c. When fats and oils are reduced, they become rancid.

d. Oxidation of fats and oils make them rancid.

11. A colourless crystal of a metal nitrate 'X', when heated gives out a dense reddish brown gas 'Y'. Identity 'X' & 'Y' and name the type of chemical reaction involved.

a. X – $FeSO_4$, Y – SO_2,
Chemical Reaction- Displacement

b. X – $FeSO_4$, Y – SO_3,
Chemical Reaction- Decomposition

c. X – $K(NO_3)_2$, Y – NO_3,
Chemical Reaction- Double decomposition

d. X – $Pb(NO_3)_2$, Y – NO_2,
Chemical Reaction- Decomposition

12. Which of the following reaction is not a photochemical reaction?

a. $CH_4 + Cl_2 \longrightarrow CH_3Cl + HCl$

b. $2AgCl \longrightarrow 2Ag + Cl_2$

c. $2AgBr \longrightarrow 2Ag + Br_2$

d. $CaCO_3 \longrightarrow CaO + CO_2$

13. Two colourless solutions 'A' and 'B' were mixed together and a yellow precipitate 'C' was formed. Identify 'A', 'B' and 'C'.

a. A – $Pb(NO_3)_2$ (R), B – KI(R), C – $PbI_2(\downarrow)$

b. A – $Pb(NO_3)_2$ (s), B – KI(s), C – $PbI_2(\uparrow)$

c. A – KI(l), B – H_2O(l), C – KOH(l)

d. A – KCl(l), B – HNO_3(l), C – $KNO_3(\downarrow)$

14. Which of the following is an example of oxidation?

a. Extraction of iron from hematite ore.

b. Evolution of hydrogen during the electrolysis of dilute sulphuric acid.

c. Conversion of ethanol to ethanoic acid.

d. When orange acidified potassium dichromate turns green.

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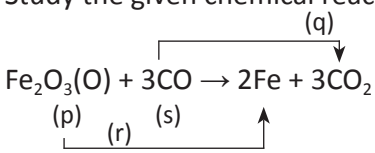
15. Study the given chemical reaction and identify p, q, r, s.



	p	q	r	s
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

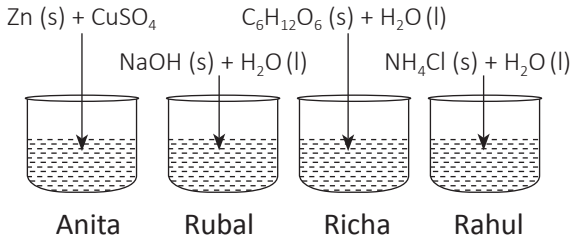
SECTION - B : EVERYDAY SCIENCE

16. A small amount of light green coloured solid 'P' is heated strongly in a dry test-tube. Initially on heating, water vapours are observed on the wall of the test-tube and then a gas 'Q' with suffocating smell comes out. The gas when dissolved in water, gives a solution which turns blue litmus 'red'. After heating, a reddish brown solid residue 'R' is left in the test-tube.

Name the chemicals P, Q and R.

	P	Q	R
a.	$Na_2SO_4.10H_2O$	SO_2	Na_2SO_4
b.	$Pb(NO_3)_2$	NO_2	PbO_2
c.	$FeSO_4$	SO_2,SO_3	Fe_2O
d.	$FeSO_4.7H_2O$	SO_2,SO_3	Fe_2O_3

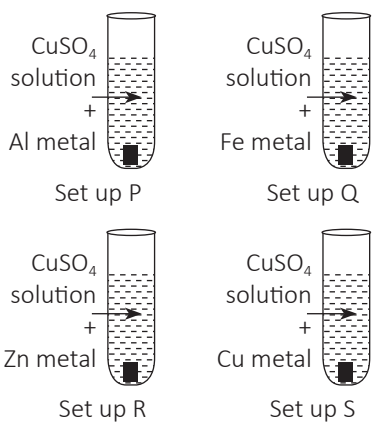
17. Four students of grade 10, Anita, Rubal, Richa and Rahul made four set ups as shown here.



They observed a change in the temperature and inferred as given here. Which of the following conclusion is correct?

	Anita	Rubal	Richa	Rahul
a.	Endo-thermic	Exo-thermic	Exo-thermic	Endo-thermic
b.	Exo-thermic	Exo-thermic	Endo-thermic	Endo-thermic
c.	Endo-thermic	Endo-thermic	Endo-thermic	Endo-thermic
d.	Exo-thermic	Exo-thermic	Exo-thermic	Exo-thermic

18. Aman is given copper sulphate powder and 4 different metal rods to compare the reactivity of metals. He prepared copper sulphate solution and dipped metal rods into it.



Aman kept all four set ups P, Q, R and S undisturbed for 5 minutes. He observed some changes. Which of the following is correct?

a. In set ups P & Q, no change is observed while in set ups R & S, the solution becomes colourless.

b. In set ups R & S, no change is observed while in P & Q, the solution becomes colourless.

c. In set ups P and R, the solution becomes colourless; in set up Q it becomes dirty green, while no change is observed in set up 'S'.

d A green coloured layer is formed over all the four metals.

19. Reeta took 8 ml of sodium sulphate solution in a test-tube. She added some amount of barium chloride solution slowly into the test-tube. She left the test-tube undisturbed for 5 minutes, a white precipitate is formed. She inferred few statements about the chemical reaction that occurred in the test-tube. Which of the following statement is correct?

a. It is a neutralisation reaction.

b. It is a displacement reaction and Cl^- ions are displaced by O_4^{-2} ions.

c. It is a double displacement reaction since exchange of ions occur between two reactants.

d. It is a combination reaction since Ba^{+2} ions combine with SO_4^{-2} ions to give $BaSO_4$.

20. Four metals A, B, C & D react with dilute HCl, and different observations are noted as given below.

Metal	Observations
A	No change
B	Temperature of reaction mixture rises
C	Reaction is explosive
D	Some gas bubbles are seen

Identify metals A, B, C & D.

a. A – K, B – Al, C – Na and D – Cu

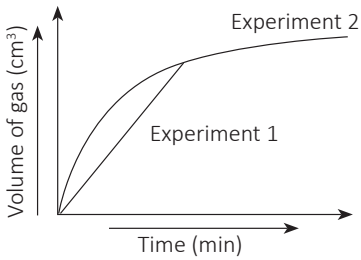
b. A – Cu, B – Pb, C – Na and D – Al

c. A – Ag, B – Al, C – Na and D – Pb

d. A – Cu, B – Ca, C – K and D – Al

SECTION - C : BRAINBOX

21. Calcium carbonate when reacts with HCl gives calcium chloride, water and carbon-dioxide gas.



The reaction is carried out twice and the given graph is obtained.

Which of the following statement(s) is/are correct?

a. Reaction is slower in experiment 1.
b. Calcium carbonate taken in experiment 2 is less than the calcium carbonate taken in experiment 1.
c. Some amount of calcium carbonate and hydrochloric acid is used for both the experiments.
d. All of these

22. A student added NaOH solution with HCl solution. Which of the following chemical equation explains the chemical reaction taking place?

a. $NaOH(s) + HCl(l) \rightarrow NaCl(s) + H_2O(l)$
b. $NaOH(l) + HCl(l) \rightarrow NaCl(l) + H_2O(l) + \Delta$
c. $NaOH(l) + HCl(l) \rightarrow NaCl(l) + H_2O(l) - \Delta$
d. $NaOH(s) + HCl(l) \rightarrow NaCl(l) + H_2O(l)$

23. $3C_3H_8O + 2CrO_3 + 3H_2SO_4 \rightarrow 3C_3H_6O + 6H_2O + Cr_2(SO_4)_3$

Which of the following is true for the reaction shown above?

a. C_3H_8O is oxidised to C_3H_6O by CrO_3.
b. CrO_3 is reduced to $Cr_2(SO_4)_3$ by H_2SO_4.
c. H_2O is the product of reduction of H_2SO_4.
d. $Cr_2(SO_4)_3$ is the salt formed by the neutralization of CrO_3 by H_2SO_4.

24. Refining of metals are generally done by oxidation, reduction and electrolysis. Which of the following chemical reaction is involved for the recovery of silver in refining of silver?

a. $2AgNO_3 + Cu \longrightarrow Cu(NO_3) + 2Ag$
b. $2AgNO_3 \xrightarrow[\text{current}]{\text{electric}} 2Ag + 3NO_2(\uparrow)$
c. $2AgCl \xrightarrow{\text{sunlight}} Ag + Cl_2(\uparrow)$
d. $2AgBr \xrightarrow{\text{sunlight}} 2Ag + Br_2(\uparrow)$

25. Carbon dioxide is to be generated by reacting 50 g of calcium carbonate granules with aqueous ethanoic acid.

Which of the following is least likely to lead to an increase in the rate of formation of carbon dioxide from calcium carbonate?

a. Warming up the acid.
b. Grinding the carbonate into fine powder.
c. Raising the pressure above the reaction mixture.
d. Using hydrochloric acid instead of ethanoic acid.

Darken your choice with HB pencil

1.	a b c d	8.	a b c d	15.	a b c d	22.	a b c d
2.	a b c d	9.	a b c d	16.	a b c d	23.	a b c d
3.	a b c d	10.	a b c d	17.	a b c d	24.	a b c d
4.	a b c d	11.	a b c d	18.	a b c d	25.	a b c d
5.	a b c d	12.	a b c d	19.	a b c d		
6.	a b c d	13.	a b c d	20.	a b c d		
7.	a b c d	14.	a b c d	21.	a b c d		

Chapter
2

Acid, Bases and Salts

- An acid may be defined as a substance which releases one or more hydrogen ion in an aqueous solution.
  - Acids which are almost completely ionized in water, are known as strong acids. Acids which are weakly ionized in water are known as weak acids.
  - A base may be defined as a substance capable of releasing one or more hydroxide ion in aqueous solution.
  - Elements are further classified into metals, non-metals and metalloids.
  - Bases have bitter taste, they are soapy to touch. Bases turn red litmus to blue. They conduct electricity in solutions.
  - A base which completely ionizes in water and thus, produces a large amount of hydroxide ions (OH^- ions) is called a strong base (or a strong alkali).
  - A base which partially ionizes in water and thus, produces a small amount of hydroxide ions (OH^- ions) is called a weak base (or a weak alkali).
  - Whenever a solution of acid dissolved in water is treated with a solution of base (dissolved in water), salt and water are formed as products. This reaction is known as neutralization reaction.

SECTION - A : SCIENTIFIC REASONING

1. A student is preparing sulphur dioxide gas by reacting copper turnings and sulphuric acid. To find whether the gas is formed, he can bring the:
   a. Burning match stick near the mouth of jar.
   b. Moist red litmus paper near the mouth of the jar.
   c. Moist blue litmus paper near the mouth of the jar.
   d. Moist filter paper near the mouth of the jar.

2. Equal moles of the following substances are dissolved in the one litre of distilled water. Which one of the following will have the minimum pH?
   a. Ammonium chloride
   b. Copper sulphate
   c. Potassium oxide
   d. Ammonia

3. Blue vitriol and Epsom salt are sulphates of two different metals but they have a few similar characteristics. Which one of the following is a common character for both the salts?
   a. Efflorescence
   b. Hygroscopy
   c. Deliquescence
   d. Both b and c

4. Radhika was given three samples containing CH_3COOH, $NaHCO_3$ and H_2O in test tubes A, B and C respectively. On dipping a pH paper in them, she observed that the colour of the solutions turned orange in test tube 'A', blue in test tube 'B' and green in test tube 'C'. If arranged in increasing order of the pH, the sequence of these test tubes would be –
   a. A, C, B
   b. A, B, C
   c. C, A, B
   d. B, C, A

5. The pH of four different solutions are given here. Which one of the following has the highest H^+ ions concentration?
   a. pH = 7.2
   b. pH = 1.2
   c. pH = 12.3
   d. pH = 3.2

6. Which of the following statement is incorrect?
   a. The atmosphere of Venus is made up of thick white and yellowish clouds of H_2SO_4.
   b. Tamarind, tomato and sour milk are natural sources of tartaric acid, citric acid and lactic acid, respectively.
   c. Bleaching powder is used for disinfecting drinking water.
   d. Electrolysis of brine gives out Cl_2 gas at anode and H_2 gas at cathode.

7. Arun added few drops of dilute HCl to a solution of compound 'X'. Which of the following could be the possible observation and the inference?
   a. The solution becomes white due to the formation of CaO and 'X' is acidic.
   b. The solution becomes white due to the formation of $Ca(OH)_2$ and 'X' is basic.
   c. The solution becomes blue-green due to the formation of $CuCl_2$ and 'X' is basic.
   d. The solution becomes blue-green due to the formation of CuO and 'X' is acidic.

8. Some chemical substances can both donate and accept a proton. They are known as amphiprotic species. Which of the following option is amphiprotic species?
   a. $H_2PO_4^-$
   b. H_2O and HCl
   c. CO_3^{-2} and H_3O^+
   d. H_2CO_3 and HCO_3^-

9. Choose the incorrect statement about the properties of bases.

   a. NaOH and KOH are strong alkalies.

   b. $Ca(OH)_2$ and $Mg(OH)_2$ are partially soluble in water.

   c. CuO when reacts with NaOH forms a salt and water.

   d. All metallic hydroxides reacts with acids to form their respective metallic salts.

10. Which of the following substance reacts with ammonium sulphate to give ammonia?

   a. Calcium oxide b. Hydrochloric acid

   c. Carbon dioxide d. Zinc nitrate

11. Which of the following contains both an acidic oxide and a basic oxide?

   a. CO_2 and CO b. CO_2 and MgO

   c. Fe_2O_3 and MgO d. SO_2 and H_2O

12. A student is given dil. HCl and four solids listed below.
   (I) Mg (II) $MgCO_3$ (III) MgO (IV) $MgSO_4$
   Which of these solids can be used to prepare magnesium chloride?

   a. I, II and IV b. I, II and III

   c. II, III and IV d. All of these

13. Doctors advise to clean our teeth with toothpaste after eating sweets and chocolates. Which of the following best describes the reason behind it?

   a. Toothpaste contains an alkali which reacts with the acid produced by eating sweets and chocolates.

   b. When sweets and chocolates decompos, they produce a base.

   c. Toothpaste contains a weak acid that helps in cleansing of the teeth.

   d. Both b and c.

14. A farmer uses water from a pond to water his fields. He finds that the pond water has become too acidic. Which of the following chemical can be used to reduce the acidity of pond water?

   a. $CaCl_2$ b. $Ca(OH)_2$

   c. $CaNO_3$ d. $CaSO_4$

15. Crude common salt is hygroscopic because of the impurities of:

   a. $CaSO_4$ and $MgSO_4$

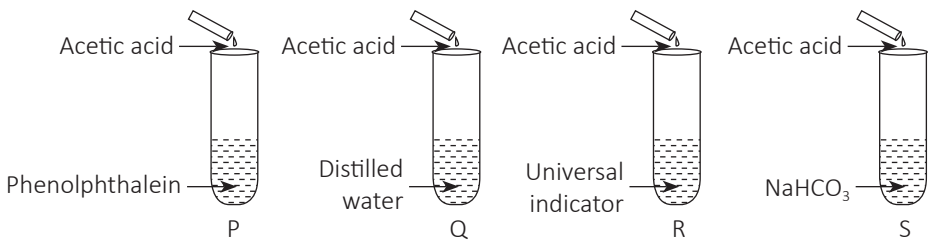
   b. $CaCl_2$ and $MgCl_2$

   c. $CaBr_2$ and $MgBr_2$

   d. $MgSO_4$ and $MgBr_2$

SECTION - B : EVERYDAY SCIENCE

16. Rohan dropped a few drops of acetic acid into four different test tubes P, Q, R, S containing different liquids as shown here.



What did he observe?

	P	Q	R	S
a.	No change	A clear solution is obtained	Solution changes to pale orange	Brisk effervescence
b.	A clear solution is obtained	No change	Solution changes to pale orange	Brisk effervescence
c.	Brisk effervescence	A clear solution is obtained	Solution changes to dark red	No change as neutralisation reaction takes place.
d.	Solution turns pink	A clear solution is obtained	Solution changes to yellow	A clear solution is obtained

17. 'Plaster of Paris' is used for supporting fractured bones. Which of the following chemical reactions best describes this property of 'Plaster of Paris'?

a. $CaSO_4.2H_2O \xrightleftharpoons{heat} CaSO_4.\frac{1}{2}H_2O + 1\frac{1}{2}H_2O$

b. $CaSO_4.2H_2O \xrightleftharpoons{heat} CaSO_4 + 2H_2O$

c. $CaSO_4.\frac{1}{2}H_2O \xrightleftharpoons{heat} CaSO_4.2H_2O$

d. $2CaSO_4.\frac{1}{2}H_2O \xrightleftharpoons{heat} 2CaSO_4 + H_2O$

18. Baking powder is a mixture of 'X' and a mild edible acid 'Y'. On heating baking powder, 'Z' is produced, Which makes cakes and breads soft and spongy. What are 'X', 'Y' and 'Z'?

	X	Y	X
a.	Sodium hydrogen carbonate	Tartaric acid	Carbon dioxide
b.	Sodium carbonate	Acetic acid	Carbon dioxide
c.	Sodium hydroxide	Acetic acid	Hydrogen
d.	Sodium hydrogen carbonate	Oxalic acid	Hydrogen

19. Arrange the following in increasing order of acidic nature

NH_4^+, H_3O^+, H_2O, HF, OH^-

a. $OH^- < H_2O < NH_4^+ < HF < H_3O^+$

b. $OH^- < NH_4^+ < HF < H_3O^+ < H_2O$

c. $OH^- < HF < H_3O^+ < H_2O < NH_4^+$

d. $OH^- > NH_4^+ > HF > H_3O^+ > H_2O$

20. A milkman adds a very small amount of baking soda to fresh milk. What is/are the possible reason behind it?

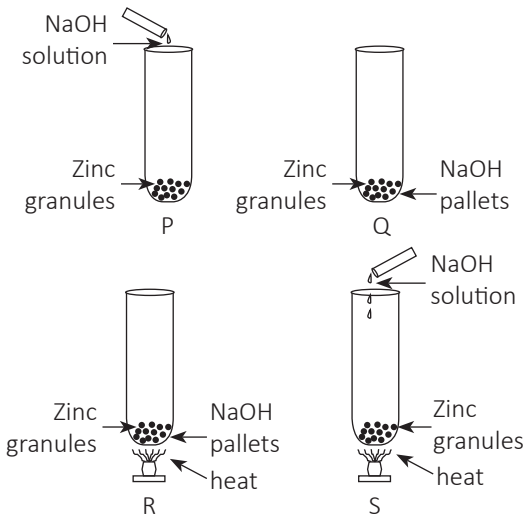
a. Baking soda increases the pH of fresh milk and keep it fresh for longer duration.

b. Baking soda decreases the pH of fresh milk and keep it fresh for longer duration.

c. Baking soda increases the density of milk and so more amount of cream is obtained.

d. Baking soda makes the milk sweeter and tastier.

21. The figures given here, show set-ups for studying reaction of sodium hydroxide and zinc granules.



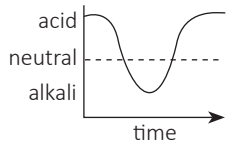
In which test-tube a rapid evolution of hydrogen gas will be observed?

a. P
b. Q
c. R
d. S

22. Which of the following statement is correct with reference to the ferrous and ferric ions?

a. Fe^{3+} gives brown colour with potassium ferricyanide.
b. Fe^{2+} gives blue precipitate with potassium ferricyanide.
c. Fe^{3+} gives black colour with potassium thiocyanate.
d. Fe^{2+} gives brown colour with ammonium thiocyanate.

23. Our mouth contains saliva which is a weak alkali. When we eat sweets, bacteria present in our mouth change the sugar into acids. A group of 4 students draw 4 graphs to show how the acidity in the mouth changes during and after eating sweets. Which of the following student best describes the process?

a.


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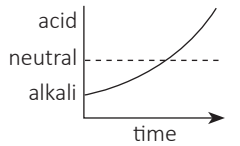

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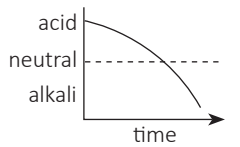

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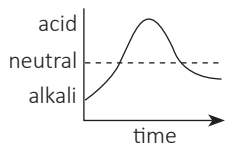


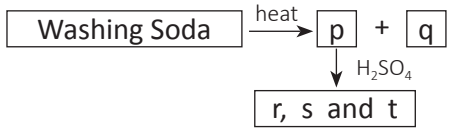
24. An experiment is carried out to compare the acidity of various fruit juices. Five drops of universal indicators are added to 25 cm^3 of each fruit juice. Aqueous NaOH is then added to each sample until the universal indicator shows that the solution is neutral. The results obtained are shown below.

Which fruit juice is the most acidic among all the 4 fruit juices given above?

Fruit Juices	Volume of NaOH of added/cm^3
Apple	9
Pear	6
Grape fruit	14
Lemon	16

a. Apple
b. Pear
c. Grape fruit
d. Lemon

25. Study the given flow chart and complete it by choosing an appropriate option.



Identify p, q, r, s and t, and choose the correct option.

	p	q	r	s	t
a.	$NaHCO_3$	H_2O	Na_2SO_4	H_2O	CO_2
b.	$NaHCO_3$	H_2O	$NaHSO_4$	Na_2SO_4	CO_2
c.	Na_2SO_4	H_2O	CO_2	Na_2CO_3	CO_2
d.	Na_2Co_3	H_2O	Na_2SO_4	H_2O	CO_2

Darken your choice with HB pencil

1.	a	b	c	d	8.	a	b	c	d	15.	a	b	c	d	22.	a	b	c	d
2.	a	b	c	d	9.	a	b	c	d	16.	a	b	c	d	23.	a	b	c	d
3.	a	b	c	d	10.	a	b	c	d	17.	a	b	c	d	24.	a	b	c	d
4.	a	b	c	d	11.	a	b	c	d	18.	a	b	c	d	25.	a	b	c	d
5.	a	b	c	d	12.	a	b	c	d	19.	a	b	c	d					
6.	a	b	c	d	13.	a	b	c	d	20.	a	b	c	d					
7.	a	b	c	d	14.	a	b	c	d	21.	a	b	c	d					

Chapter
3

Metals and Non-Metals

- Most of the metals are solid under normal conditions of temperature and pressure.
  Exception - Mercury exists in liquid state at room temperature.
  - Metals, except Na and K, have high melting and boiling points. Most of the metals like iron, zinc, copper are hard, but there are some metals like sodium and potassium, which are soft and can be cut with a knife.
  - The metals above hydrogen in the activity series have greater tendency than hydrogen to loose electrons in their solutions. Such metals are called electropositive metals.
  - Metal oxides are basic in nature except Al_2O_3 and ZnO.
  - Non-metals can exist in all three states, i.e., solid, liquid and gas. Non-metals are neither malleable nor ductile.
  - Non-metals are bad conductors of heat and electricity, because they do not have free electrons in their lattice except graphite.
  - Galvanisation, electroplating and alloying with metals are the methods to prevent metal from corrosion.

SECTION - A : SCIENTIFIC REASONING

1. Which of the following statement explains why metals are good thermal conductors?
   a. Metals have a sea of delocalized valence electrons.
   b. Metals have a lattice structure which allow them to deform easily.
   c. Metals have closely packed metal cations arranged in the metal lattice.
   d. Metals usually have one to three valence electrons which are lost during a chemical reaction to form an ionic bond.

2. Among the given pairs, which pair give displacement reaction?
   a. NaCl solution and copper metal
   b. $MgCl_2$ solution and aluminium metal
   c. $FeSO_4$ solution and silver metal
   d. $AgNO_3$ solution and copper metal

3. Which of the following process is used for the concentration of Bauxite ($Al_2O_3.2H_2O$)?
   a. Froth floatation
   b. Leaching
   c. Liquation
   d. Magnetic separation

4. On dissolving moderate amount of sodium metal in liquid ammonia at low temperature, which of the following does not occur?
   a. The liquid ammonia remains diamagnetic.
   b. Liquid ammonia becomes good conductor of electricity.
   c. Na^+ ions are formed in the solution.
   d. Both a and b.

5. Alloys are more durable than their respective metals. Which of the following properties of aluminium alloys are required for making aircraft bodies?
   a. Thermal and electrical conductivity.
   b. High strength and low density.
   c. Low strength and high density.
   d. High strength and electrical conductivity.

6. Haematite is converted to iron in a blast furnace. The word equation for this reaction is:

   Haematite + Carbon monoxide → Iron + X

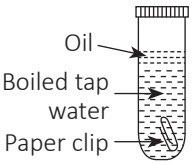
   What is 'X'?
   a. Carbon
   b. Carbon dioxide
   c. Hydrogen
   d. Oxygen

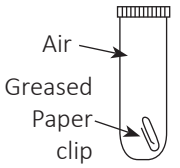
7. Choose the correct statement.
   a. Metals like K, Ca and Mg are always found in free state in nature.
   b. Reactivity of Al decreases if it is dipped in HNO_3 solution.
   c. Carbon can reduce Na_2O and MgO.
   d. NaCl conducts electricity even in its solid state.

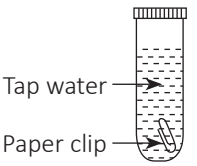
8. Which of the following is not a reason for recycling metals?
   a. Metal ores are limited resource.
   b. Recycling of metals increase the purity of metals.
   c. Recycling of metals reduce air pollution.
   d. Recycling of metals reduce the cost of producing metals.

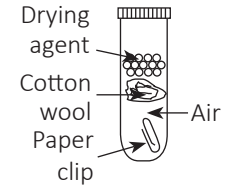
9. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. Identify the element.
   a. Ca
   b. C
   c. Si
   d. Fe

10. Four shiny steel paper clips are placed for one week in test-tubes under different conditions as shown here. In which test-tube does the paper clip rusts?

a. 

b. 

c. 

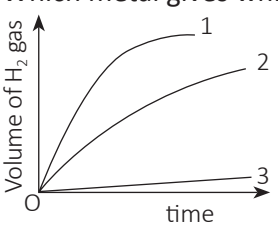
d. 

11. Three elements are mixed to make steel. Name these elements.

a. Al, C, Cr
b. Al, Cu, Mg
c, C, Cr, Fe
d. Cu, Fe, Mg

12. Three metals Cu, Fe, and Mg are added to an excess of dilute HCl in 3 different beakers. A graph is drawn to compare their rate of reaction.

Which metal gives which curve?



	1	2	3
a.	Fe	Cu	Mg
b.	Fe	Mg	Cu
c.	Mg	Cu	Fe
d.	Mg	Fe	Cu

13. 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.

14. Which of the following process is used in the extractive metallurgy of magnesium ?

a. Fused salt electrolysis
b. Self reduction
c. Aqueous solution electrolysis
d. Thermite reduction

15. Why does the steel used to make drill bits contain manganese?

a. To increase the density of the steel
b. To increase the hardness of the steel
c. To increase the malleability of the steel
d. To increase the melting point of the steel

SECTION - B : EVERYDAY SCIENCE

16. A non-metal 'P' is an important constituent of our food. It forms two oxides 'Q' and 'R'. 'Q' is toxic and causes suffocation and even death, while 'R' is responsible for global warming. Identify P, Q and R.

a. P = C, Q = CO, R = CO_2
b. P = S, Q = SO_2, R = SO_3
c. P = P, Q = P_2O_3, R = P_2O_5
d. P = O, Q = O_2, R = O_3

17. Jewellers use 'Royal water' to dissolve noble metals such as gold and platinum. It is a mixture of two strong acids X and Y in ratio, 3 : 1. Name 'Royal water', X and Y.

a. Royal water- $AuCl_3$, X- HNO_3, Y- HCl
b. Royal water- Aquaregia, X- HCl, Y- HNO_3
c. Royal water- $AuCl_4$, X- HCl, Y- HNO_3
d. Royal water- Aquaregia, X- H_2SO_4, Y- HNO_3

18. Food cans are coated with 'Sn' metal not with 'Zn' metal. It is because 'Zn' metal :

    a. has higher melting point than Sn.
    b. is more reactive than Sn.
    c. is less reactive than Sn.
    d. is costlier than Sn.

19. Rohan stored lemon water in a copper jug. His mother told him not to drink this lemon water. Why did she stop him to drink this lemon water to drink?

    a. The taste of lemon water becomes bitter.
    b. Lemon water becomes poisonous as it reacts with the copper metal.
    c. Copper is germicide in nature and so germs get mixed with the lemon water.
    d. When lemon water reacts with copper metal, it becomes more acidic and can cause stomach acidity.

20. Anuva's mother wears silver ornaments. But in few days, her ornaments tarnishes black. What is the possible reason for tarnishing of her silver ornaments?

    a. The ornaments are not made of good quality silver.
    b. The ornaments are made of good quality silver.
    c. Anuva's mother lives in a polluted region where the amount of sulphur in the air pollutants is high.
    d. Both b and c.

SECTION - C : BRAINBOX

21. Atharv took a mixture of lead oxide and an element 'X' in a crucible and heated it strongly. A residue is left behind after heating. Anushka told Atharv that he could replace element 'X' with a metal 'Y' to get the same result.

    What are the residue obtained, element 'X' and metal 'Y' respectively?

    a. White powder of Pb, Zn and K.
    b. Shiny globules of Pb, C and Pt.
    c. Shiny globules of Pb, C and Cu.
    d. Brown crystals of Pb_2CO_3, Cu and Mg.

22. A teacher taught about properties of metals. She then gave some clues to identify few metals. Read the clues given by her.

    The clues are :

    1. Metals are generally ductile and metal 'P' is the most ductile metal.
    2. Melting point of metals are generally high, but metal 'Q' has very low melting point.
    3. Metals are good conductors, but metal 'R' is a poor conductor of electricity.
    4. Among P, Q, R and S, metal S is the poorest thermal conductor.

    Name the elements P, Q, R and S respectively.

    a. Al, Na, Pb and Ag.
    b. Au, K, Hg and Pb.
    c. Cu, Zn, Ag and Hg.
    d. Fe, Na, Au and Pb.

23. An chemical equation for a reaction involved to join railway tracks is written as :

    $Fe_2O_3(s) + 2Al(s) \longrightarrow 2Fe + Al_2O_3$

    Which of the following statement about this reaction correct?

    a. The mixture of reactants is ignited by inserting magnesium ribbon and then burning it.
    b. It is known as a thermite reaction.
    c. The reaction is highly exothermic.
    d. All of these

24. Four different solutions are treated with 4 different metals one by one. The result is shown in a tabular form.

Metals	Reacts with $FeSO_4$	Reacts with $CuSO_4$	Reacts with $ZnSO_4$	Reacts with $AgNO_3$
W	No	Yes	No	Yes
X	Yes	Yes	–	Yes
Y	No	–	Yes	Yes
Z	No	No	No	No

Based on the result obtained, which of the given statement is incorrect?

a. X is more reactive than Fe but less reactive than Ag.

b. W is more reactive than Cu but less reactive than Fe.

c. Y is less reactive than Ag but more reactive than Zn.

d. Z is the least reactive metal among all the metals.

25. Study the electrical properties of four substances given below. Identify and name these substances.

P. Substance 'P' does never conduct electricity.

Q. Substance 'Q' conducts electricity only in its aqueous solution.

R. Substance 'R' conducts electricity in both molten and solid states.

S. Substance 'S' does not conduct electricity in both molten state and aqueous solution.

Choose the correct option –

a. P – S, Q – HCl, R – Pb, S – NaCl

b. P – S, Q – NaCl, R – Cu, S – Pb

c. P – Pb, Q – Ag, R – NaCl, S – S

d. P – HCl, Q – NaCl, R – S, S – Pb

Darken your choice with HB pencil

1.	(a) (b) (c) (d)	8.	(a) (b) (c) (d)	15.	(a) (b) (c) (d)	22.	(a) (b) (c) (d)
2.	(a) (b) (c) (d)	9.	(a) (b) (c) (d)	16.	(a) (b) (c) (d)	23.	(a) (b) (c) (d)
3.	(a) (b) (c) (d)	10.	(a) (b) (c) (d)	17.	(a) (b) (c) (d)	24.	(a) (b) (c) (d)
4.	(a) (b) (c) (d)	11.	(a) (b) (c) (d)	18.	(a) (b) (c) (d)	25.	(a) (b) (c) (d)
5.	(a) (b) (c) (d)	12.	(a) (b) (c) (d)	19.	(a) (b) (c) (d)		
6.	(a) (b) (c) (d)	13.	(a) (b) (c) (d)	20.	(a) (b) (c) (d)		
7.	(a) (b) (c) (d)	14.	(a) (b) (c) (d)	21.	(a) (b) (c) (d)		

Chapter
4

Carbon and Its Compounds

- In nature, all animal and plant products in solid states are compounds of carbon such as cellulose, carbohydrates, fats, proteins, etc.
  - The two characteristic properties of carbon element which lead to the formation of a very large number of organic compound are catenation and tetravalency.
  - Crystalline forms of carbon having 30 to 960 atoms in their molecules are called Fullerenes. A compound made up of hydrogen and carbon is called a hydrocarbon.
  - Hydrocarbons are of two types: saturated hydrocarbons and unsaturated hydrocarbons.
  - A hydrocarbon, in which the carbon atoms are connected only by only a single bond is called a saturated hydrocarbon.
  - A hydrocarbon, in which the two carbon atoms are connected by a 'double bond' or a 'triple bond' is called an unsaturated hydrocarbon.
  - The number of organic compounds are very large. In order to have a systematic study of these compounds, they have been divided into a number of families called homologous series.
  - The functional group in an organic compound is an atom or a group of atoms which largely determines the properties of the organic compound.

SECTION - A : SCIENTIFIC REASONING

1. Which of the following statements are usually correct for carbon compounds?
   (i) They are good conductors of electricity.
   (ii) They are poor conductors of electricity.
   (iii) They have strong forces of attraction between their molecules.
   (iv) They do not have strong forces of attraction between their molecules.
   a. (ii) and (iv) b. (i) and (iv)
   c. (i) and (iii) d. (ii) and (iii)

2. LPG contains smell less gases. For detecting the leakage of LPG, which of the following is mixed with LPG?
   a. Ethyl Mercaptan
   b. Hydrogen Sulphide
   c. Sulphur
   d. Chlorine

3. Which of the following statement about alkanes is correct?
   a. They can be formed by the reduction of alkenes.
   b. They can be reduced by the addition of hydrogen.
   c. They cannot undergo any reaction except substitution.
   d. They can be polymerized to form long chain of hydrocarbons.

4. Ethene, when heated with HCl gives the same product as a mixture of ethane and chlorine exposed to UV light. What is the type of reaction undergone by ethane?
   a. Chlorination
   b. Elimination
   c. Addition
   d. Displacement

5. Choose the incorrect statement.
   a. People sleeping in a closed room with coal burning inside have died due to CO_2 poisoning.
   b. CO combines with hemoglobin of the blood to give carboxy hemoglobin, which is not an oxygen carrier.
   c. CO is poisonous in nature.
   d. Concentration of 1 part of CO in 800 volumes of air will cause death in 30 minutes.

6. In preparation of wood charcoal, liquid pyroligneous acid is obtained. Which one of the following chemical does it contain?
   a. CH_3COCH_3 b. CH_3OH
   c. CH_3COOH d. C_2H_5OH

7. The process of producing unsaturated hydro carbons from saturated hydro carbon by heating at high temperature is called –
   a. Reduction
   b. Oxidation
   c. Hydrogenation
   d. Cracking

8. Which of the following alkenes can form an alcohol which can only have three structural isomers?
   a. Butene
   b. Propene
   c. Pentene
   d. Ethene

9. Carbon element has a tendency to form a large number of compounds. It is because of its property of –
   I. tetra valency. II. catenation.
   III. isomerism. IV. loosing electrons.

Choose the correct option.

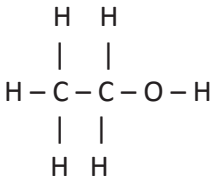
a. I. and II.

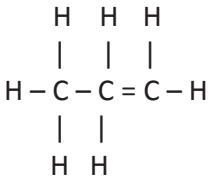
b. I., II. and III.

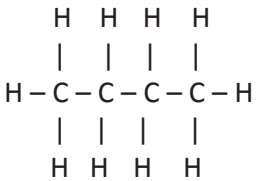
c. II., III. and IV.

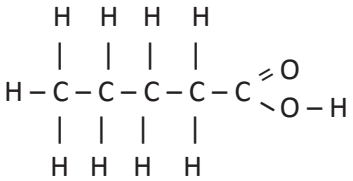
d. I., II., III and IV.

10. Which of the following structure shows an unsaturated hydrocarbon?

a.


b.


c.


d.


11. Which of the following reaction is an example of the cracking of an alkane?

a $3C_2H_4 \longrightarrow C_6H_{12}$

b. $C_8H_{12} \longrightarrow C_6H_{14}$

c $C_6H_{14} \longrightarrow 6C + 7H_2$

d. $C_6H_{14} \longrightarrow C_2H_4 + C_4H_{10}$

12. Which of the following statements is incorrect about soaps and detergents?

a. Soaps are non-biodegradable, while detergents are biodegradable.

b. The polar group in soaps is COONa and in detergents, it is SO_3Na.

c. Hardness of water is due to the presence of Ca and Mg salts which form scum with soap.

d. Detergents can be used with acidic water but soaps cannot be used.

13. A hydrocarbon which can add two molecules of Cl_2 is :

a. $H_2C = CH - CH = CH_2$

b. $CH_2 = CH_2$

c. $CH_3 - CH = CH - CH_3$

d. $CH_2 - CH = CH_2$

14. There are a few chemical processes given below. Read them and identify the one process in which the product has more carbon atoms than the reactants.

a. Oxidation of alcohol to produce a carboxylic acid.

b. Complete combustion of butane.

c. Reaction of sodium carbonate with carboxylic acid.

d. Esterification of ethanol.

15. Some foods are described as poly unsaturated. What does poly unsaturated mean?

a. The molecules in the food can be polymerised.

b. The molecules in the food contain many carbon atoms.

c. The molecules in the food contains many double bonds.

d. The molecules in the food contains many hydrogen atoms.

SECTION - B : EVERYDAY SCIENCE

16. Rahul's mother cooks food on a kerosene stove. While cooking, She noticed that the stove's flame was sooty and yellow. What is the possible reason for the sooty flame?
    a. The air hole at the base of the stove is completely open.
    b. The air hole at the base of the stove is closed.
    c. The kerosene used in the stove is free from impurities.
    d. Both b and c.

17. People use variety of methods to wash clothes. Usually, after adding the soap, they beat the clothes on a stone, or beat it with a paddle, scrub with a brush or the mixture is agitated in a washing machine. Why is agitation necessary?
    a. To mix the soap solution with water and get a homogeneous solution.
    b. Agitation helps in micelle formation.
    c. Agitation helps to remove micelles formed and so the dirt or oil molecules.
    d. Both b and c.

18. Vegetable oils are considered healthy as compared to vegetable ghee. Which of the following statement justifies the given statement?
    a. Vegetable oils contain unsaturated fatty acid, while vegetable ghee contains saturated fatty acids.
    b. Vegetable oils contain saturated fatty acid, while vegetable ghee contains unsaturated fatty acids.
    c. Vegetable oils are converted into vegetable ghee by adding hydrogen.
    d. Vegetable ghee contains poisonous elements.

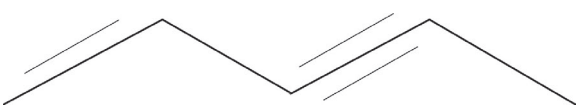
19. Some students prepared an ester by heating a mixture of 12 g of ethanoic acid and 3.2 g of methanol with conc. H_2SO_4. Find out the number of moles of CH_3COOH and CH_3OH used and ester produced.

	No. of moles of CH_3COOH	No. of moles of CH_3OH	Ester produced
a.	1	5	Methanoate
b.	0.1	0.2	Ethyl Ethanoate
c.	0.2	0.1	Methyl Ethanoate
d.	0.2	0.1	Ethyl Ethanoate

20. An organic compound 'P', is a necessary constituent of wine and beer. Oxidation of 'P' gives an organic acid 'Q' which is available in vinegar. Identify 'P' and 'Q'.
    a. P – CH_3OH, Q – CH_3COOH
    b. P – C_2H_5OH, Q – CH_3COOH
    c. P – CH_3COOH, Q – C_2H_5OH
    d. P – CH_3COCH_3, Q – CH_3COOH

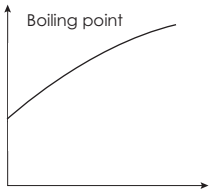
SECTION - C : BRAINBOX

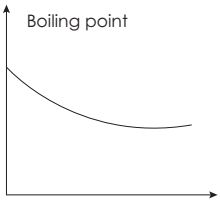
21. What is the IUPAC name of the compound shown below?

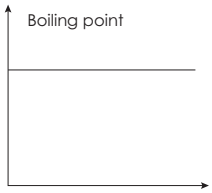


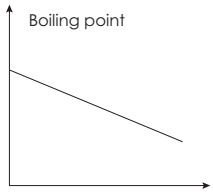
    a. 1-penten-3-yne
    b. 2-penten-2-yne
    c. hex-2-en-3-yne
    d. pent-1-en-3-yne

22. Which of the following graphs show that the boiling point changes the homologous series for alkenes?

a. 

b. 

c. 

d. 

23. Soaps are not so effective in case of hard water. Which of the following chemical reaction best represents the action of soap in hard water?

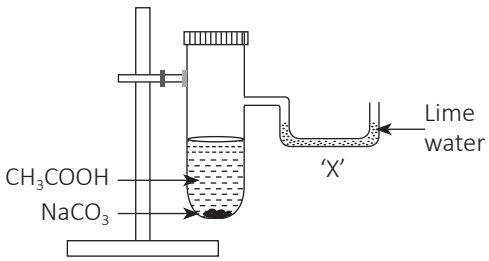
a. $Ca^{+2} + 2RCOONa \longrightarrow (RCOO)_2Ca + 2Na^+$

b. $Mg^{+2} + 3RCOONa \longrightarrow (RCOO)_2Mg + 3Na^+$

c. $Ca^{+2} + RCOONa \longrightarrow (RCOO)CO_2 + Na^+$

d. $MgSO_4 + RCOOCa \longrightarrow (RCOO)Mg + Ca^{+2}$

24. Observe the given set up. What happens to lime water in tube 'X' when a chemical reaction occurs in the test-tube?



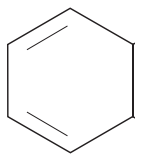
a. Lime water turns milky.

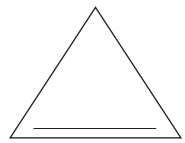
b. $Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 \downarrow + H_2O$

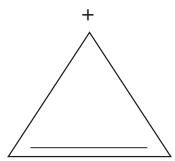
c. After few minutes, milky lime water becomes colourless.

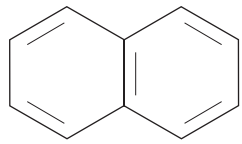
d. All are correct.

25. Which of the following is non-aromatic?

a. 

b. 

c. 

d. 

Darken your choice with HB pencil

1.	(a) (b) (c) (d)	8.	(a) (b) (c) (d)	15.	(a) (b) (c) (d)	22.	(a) (b) (c) (d)
2.	(a) (b) (c) (d)	9.	(a) (b) (c) (d)	16.	(a) (b) (c) (d)	23.	(a) (b) (c) (d)
3.	(a) (b) (c) (d)	10.	(a) (b) (c) (d)	17.	(a) (b) (c) (d)	24.	(a) (b) (c) (d)
4.	(a) (b) (c) (d)	11.	(a) (b) (c) (d)	18.	(a) (b) (c) (d)	25.	(a) (b) (c) (d)
5.	(a) (b) (c) (d)	12.	(a) (b) (c) (d)	19.	(a) (b) (c) (d)		
6.	(a) (b) (c) (d)	13.	(a) (b) (c) (d)	20.	(a) (b) (c) (d)		
7.	(a) (b) (c) (d)	14.	(a) (b) (c) (d)	21.	(a) (b) (c) (d)		

Chapter
5

Periodic Classification of Elements

- Dobereiner (1817) arranged the elements having similar properties in the group of three each. He called these groups as Triads.
  - Mendeleev's Periodic table could predict errors in the atomic masses of some elements on the basis of their position in the periodic table. For example, the atomic mass of uranium was corrected from 120 to 240.
  - Mendeleev classified the elements in order of their increasing atomic masses. While doing so, he left some vacant places in the table. These vacant places were for the elements, which were not known at that time.
  - In Mendeleev's Periodic table, the noble gases are placed in a separate group because they are chemically unreactive.
  - Modern periodic table has 18 vertical columns called groups. The groups are numbered from 1 to 18 (in Arabic numerals) from left to right. All elements present in a group have similar electronic configurations and have the same number of valence electrons.
  - There are seven periods in the modern periodic table. The period number corresponds to the highest principal quantum number (n) of the elements. The first period contains 2 elements. The subsequent periods consists of 8, 8, 18, 18 and 32 elements, respectively.

SECTION - A : SCIENTIFIC REASONING

1. Which of the following is a drawback of the Modern Periodic Table?
   a. The position of Isotopes.
   b. The position of Hydrogen.
   c. Presence of dissimilar elements in a group.
   d. All of the above.

2. An element X forms a bromide XBr_2; X would most likely be in the same group of periodic table as:
   a. Sodium b. Magnesium
   c. Aluminium d. Silicon

3. The elements A, B, C, D and E have atomic numbers 9, 11, 17, 12 and 13 respectively. The pair of elements which belongs to the same group of the periodic table is
   a. A and B b. B and D
   c. A and C d. D and E

4. In a periodic table, how does the metallic character of the elements vary from left to right across a period?
   a. It decreases.
   b. It increases.
   c. It first increases then decreases.
   d. It remains same.

5. Which of the following properties cannot be predicted from the position of the elements in the periodic table?
   a. Nature of oxide of the isotopes.
   b. Formula of a particular compound.
   c. The total number of isotopes.
   d. Oxidising or reducing nature.

6. Choose the correct statement.
   a. The electron affinity of C is greater than the O element.
   b. The electron affinity of Br is less than the Cl element.
   c. The electron affinity of O is greater than the F element.
   d. The electron affinity of I is greater than the Br element.

7. An element 'A' belongs to group I and period 4 of the periodic table. This element precedes an element 'B' in the group. An element 'C' succeeds 'B' in the period. Arrange these three elements in decreasing order of their atomic radii.
   a. B < A > C b. B > C > A
   c. B < C < A d. A > B > C

8. The 3rd period of the periodic table is shown as :
   $_{11}Na^{23}$ $_{12}Mg^{24}$ $_{13}Al^{27}$ $_{14}Si^{28}$ $_{15}P^{31}$ $_{16}S^{32}$ $_{17}Cl^{35}$ $_{18}Al^{40}$
   When we move across the period, the elements –
   a. become more dense.
   b. change from liquid to solid.
   c. change from metallic to non-metallic.
   d. have fewer electrons in their outermost shell.

9. In the periodic table, neighbouring elements are generally, more related to each other in their physical and chemical properties than the ones farther away. Identify the combination of unrelated families.
   a. Iron, cobalt and nickel
   b. Chlorine, bromine and iodine
   c. Chromium, molybdenum and tungsten
   d. Oxygen, carbon and phosphorous

10. Germanium has properties similar to:
    a. Eka- silicon b. Eka-boron
    c. Eka-aluminium d. Eka-germanium

11. The ionisation energies of 4 elements P, Q, R and S are 2480, 650, 830 and 1690 kJ/mol respectively. Which one of the following statement is correct about these elements?

a. Element Q is a reactive metal.
b. Element S is a reactive non-metal.
c. Element P is most probably an inert gas.
d. Element R is an inert gas.

12. Di-negative anion of oxygen (O_2^-) is quite common but di-negative anion of sulphur (S_2^-) is less common. Why?
    I. On moving down the group, the size of the atom increases and the tendency to gain electrons decrease.
    II. Thus the tendency to accept 2 more electrons as to attain octet in outermost shell decreases i.e., tendency to form S_2^- is decreased.
    a. Only I b. Only II
    c. Both I and II d. None of the above

13. When we move from top to bottom in a group:
    I. The metallic character of elements increase.
    II. The distance between valence electrons and nucleus increases and the attractive force between then decreases.
    III. Electropositive character increases.
    a. I and II b. II and III
    c. I, II and III d. Only III

14. Some elements have been arranged in a sequence based on their increasing atomic masses.

    F, Na, Mg, Al, Si, P, S, Cl, Ar, K

    Which of the two sets of elements will have similar properties?
    a. F & Cl and Na & K
    b. F & Al and Si & S
    c. Na & Mg and Al & K
    d. P & S and Cl & Ar

15. Which of the following trend occurs when we move down the group in Gp I of the periodic table?

	Melting point	Rate of reaction with water
a.	decreases	decreases
b.	decreases	increases
c.	increases	decreases
d.	increases	increases

SECTION - B : EVERYDAY SCIENCE

16. In the group VIII of Mendeleev's Periodic Table, why does cobalt with atomic mass 58.93 appears before nickel having atomic mass 58.71?
    I. Cobalt has the properties similar to rhodium.
    II. In order to group elements with similar properties together, cobalt was placed before nickel.
    III. Elements in this group were placed according to their electropositive characters.
    a. I, II and III b. I and II
    c. Only II d. Only III

17. A zig-zag line separates the metals from the non-metals almost in the middle of the modern periodic table. These elements placed on borderline have properties like:
    I. The electro negativities are between those of the metals and the nonmetals.
    II. Reactivity depends on the properties of the other elements in a reaction.
    III. They often make good semiconductors.
    IV. Their ionization energies are between those of the metals and nonmetals.
    a. I and II b. II and III
    c. I, II, III and IV d. II and IV

18. A data book gives the following information about an element.

Appearance	Silvery gray solid
melting point	63°C
Density	0.86 g/cm^3
Reaction with water	Vigorous reaction with cold water

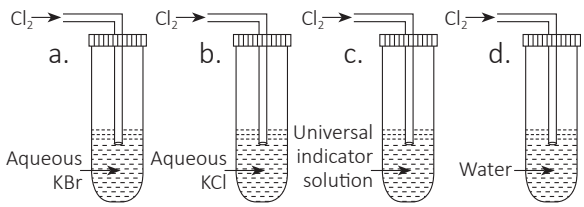
What is the position of this element in the periodic table?

a. Zero Group b. 1st Group
c. 2nd Group d. 7th Group

19. Read the given paragraph and answer the question based on the given information.
All the elements in the group VII of the periodic table react with hydrogen.
Element 'F' reacts explosively in dark and at a very low temperature.
Element 'Cl' reacts explosively in presence of sunlight, at room temperature.
Element 'Br' reacts explosively in presence of sunlight, if heated about 200°C.
Which of the following statements is/are correct about element 'I'?

a. Iodine reacts with hydrogen in presence of strong sunlight.
b. Iodine reacts with hydrogen when heated above 400°C.
c. Iodine has the largest atomic radii among F, Cl, Br and I.
d. All of these

20. A student passes Cl_2 gas in four test tubes containing different solutions as shown here. In which test tube, an orange-brown colour is seen?

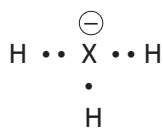
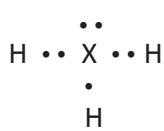
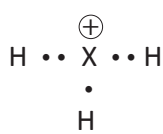
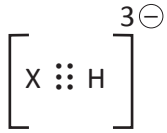


SECTION - C : BRAINBOX

21. Study the electronic configuration of the given elements.
W ⟶ 2, 8, 8, 1, X ⟶ 2, 8, 7, Y ⟶ 2, 7, Z ⟶ 2, 8, 3
Some conclusions are drawn about these elements with the help of their electronic configuration.
(i) Element W is an alkali metal.
(ii) Element X and Z belongs to the same period.
(iii) Element Y and Z are non-metals.
(iv) Element X and Y belong to the same group.
(v) Element Z has covalency of 5.
Choose the incorrect statements about these elements.

a. (i), (ii) & (iii) b. (iii) & (iv)
c. (iii) & (v) d. (ii), (iii) & (v)

22. An element 'X' of the group 15 is a diatomic molecule and it combines with hydrogen at 773 K in presence of a catalyst to give a compound XH_3 having a characteristic pungent smell.
Which of the following structures best explains the bond formation in XH_3?

a 
b. 
c. 
d. 

23. An element 'A' is yellow solid at room temperature showing catenation and allotropy. This element forms two oxides

which are also formed on thermal decomposition of ferrous sulphate crystals. These oxides are major air pollutants as well. Identify the element and name these two oxides.

	Element	Oxides
a.	C	CO & CO_2
b.	N	NO_2 & NO_3
c.	S	SO_2 & SO_3
d.	Fe	Fe_2O_3 & Fe_3O_4

24. The correct sequence of increasing order of reactivity of metals Na, K, Ca and Hg is :

a. Na > K > Ca > Hg

b. Hg < Ca < Na < K

c. Ca < Hg < Na < K

d. K > Na > Hg > Ca

25. Some chemical substances when treated with China rose indicator, changed the colour of indicator as tabulated here. Which one of them is not correctly matched?

	Chemical substance	Colour change on adding China rose indicator
a.	Oxide of an element of group 16 and period 3	Magenta
b.	Oxide of an element with electronic configuration 2, 8, 4	Magenta
c.	Hydroxide of group 2 element	Red
d.	Hydroxide of an element with electronic configuration 2, 8, 8, 2	Green

Darken your choice with HB pencil

1.	a	b	c	d	8.	a	b	c	d	15.	a	b	c	d	22.	a	b	c	d						
2.	a	b	c	d	9.	a	b	c	d	16.	a	b	c	d	23.	a	b	c	d						
3.	a	b	c	d	10.	a	b	c	d	17.	a	b	c	d	24.	a	b	c	d						
4.	a	b	c	d	11.	a	b	c	d	18.	a	b	c	d	25.	a	b	c	d						
5.	a	b	c	d	12.	a	b	c	d	19.	a	b	c	d											
6.	a	b	c	d	13.	a	b	c	d	20.	a	b	c	d											
7.	a	b	c	d	14.	a	b	c	d	21.	a	b	c	d											

Chapter

6

Life Processes

➡ Life processes are the maintenance processes that are required for preventing damage and breakdown taking place inside the body. These processes maintain proper functioning of human body. Nutrition, respiration, transportation and excretion are the four main types of life processes.

- Nutrition is the process of obtaining nutrients through the process of digestion. In the alimentary canal, the food is broken down into simple molecules and is digested to give energy.
- During the process of aerobic respiration, pyruvate breaks down completely in the presence of oxygen to give carbon dioxide (3 molecules) and water.

$$\text{Pyruvate} \xrightarrow[\text{oxygen}]{\text{mitochondria}} 3CO_2 + H_2O$$

- Haemoglobin is a respiratory pigment present in the RBCs. It has high affinity for oxygen. It transports oxygen and carbon dioxide.
- Excretory products are removed in the form of soluble nitrogenous wastes. The organs involved are kidneys, uterus, urinary bladder and urethra.
- Body fluids involved in the transportation of the nutrients are blood and lymph.
- Endocrine system consists of glands that secrete chemicals called hormones.

Name of the gland	**Hormone secreted**	**Function**
Adrenal	Adrenaline	Fighting stressful and fearful situations
Pituitary	Growth hormone	Regulation of growth and development of the body
Thyroid	Thyroxin	Metabolism of carbohydrates, fats and proteins
Pancreas	Insulin	Metabolism of sugar
Testis	Testosterone	Causes changes at the time of puberty in males
Ovary	Oestrogen	Causes changes at the time of puberty in females

SECTION - A : SCIENTIFIC REASONING

1. Which of the following statement is correct regarding amylase, rennin and trypsin?
   a. They are proteins.
   b. They act when the pH value of a body is lower than 7.
   c. They are produced in the stomach.
   d. They are proteolytic enzymes.

2. The absorption of glycerol, fatty acids and monoglycerides take place in the:
   a. colon.
   b. wall of the stomach.
   c. capillaries within the villi.
   d. lymph vessels within the villi.

3. The compensation point of Photosynthesis is known as:
   a. the point at which the rate of photosynthesis exceeds the rate of respiration.
   b. the point at which the rate of photosynthesis is equal to the rate of cellular respiration.
   c. the point at which the amount of oxygen released during photosynthesis is equal to the amount of carbon dioxide released during respiration.
   d. the point at which the amount of carbon dioxide taken in, is equal to the amount of oxygen given out during photosynthesis.

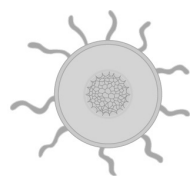
4. A patient is unable to produce blood cell. Which of the following would be a likely consequence of his condition?
   a. Enhanced production of antibodies.
   b. Reduced production of antibodies.
   c. Reduced oxygen carrying capacity of the blood.
   d. Low blood glucose concentration.

5. The lamina of a leaf is usually thin and flat because:
   a. it prevents the leaf from being too heavy.
   b. it enables a leaf to prevent bleaching of the leaf cells by excess of sunlight.
   c. it enables a leaf to speed up the rate at which carbon dioxide reaches the inner cells.
   d. it enables sunlight to reach more guard cells.

6. Coagulopathies are the conditions characterized by the inability of blood to clot. Identify the proteins whose deficiency causes coagulopathies.
   I. Albumin II. Fibrinogen
   III. Prothrombin IV. Thrombokinase
   a. I and III b. I, II, III and IV
   c. II, III and IV d. III and IV

7. The pituitary gland is often described as "The Leader of Endocrine Orchestra" because it:
   I. controls the activities of all other endocrine organs in vertebrates.
   II. controls the activities of thyroid gland, gonads and adrenal cortex.
   III. controls the growth in vertebrates.
   IV. is responsible for gigantism.
   a. Only I b. II and III
   c. I and IV d. Only II

8. Refer to the diagram of the cross section of dicotyledonous root. Which of the following is not a correct evidence to show that the diagram is that of a cross-section of a root?



a. There is no central pith in the given diagram.

b. Both xylem and phloem vessels are present.

c. Two arms of the xylem tissue alternate with the regions of phloem tissue.

d. The epidermal layer consists of long cytoplasmic extensions.

9. The step of glycolysis where $NADH^+H^+$ is formed is:

a. Glucose to fructose-6-phosphate.

b. Glyceraldehyde phosphate to 1,3-biphosphoglycerate.

c. 3-PGA to 3-biphosphoglycerate.

d. Phosphoenolpyruvate to pyruvic acid.

10. Which of the following is not related to ANS (Autonomic Nervous System)?

a. Peristalsis b. Digestion

c. Excretion d. Memory and learning

11. Transpiration has been described as a "necessary evil" because it is inevitable, but potentially harmful. Which of the following statement does not describe it?

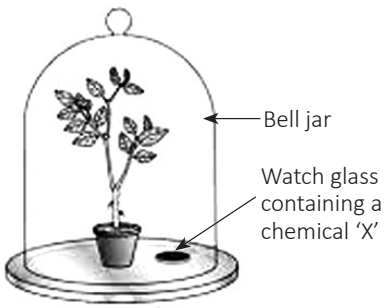
a. It causes absorption of mineral salts.

b. It causes wilting and injury in the plants.

c. It does not affect the plant temperature.

d. it causes ascent of the sap.

12. A group of students set up an experiment to show that CO_2 is essential for photo synthesis process.



Which chemical substance did they keep in watch-glass and why?

a. KOH, to absorb excess of CO_2 present in the bell jar.

b. KOH, to absorb moisture present in the bell jar.

c. NaOH, to absorb moisture present in the bell jar.

d. NaOH, to absorb excess of CO_2 present in the bell jar.

13. Megakaryocytes take part in:

a. production of blood platelets.

b. production of leucocytes.

c. transportation of oxygen.

d. transportation of carbon dioxide.

14. Some students of Grade 10 wrote some statements about photosynthesis. Which one of them is not correct?

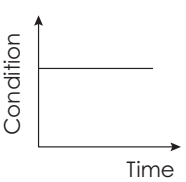
a. Chloroplasts absorb light energy.

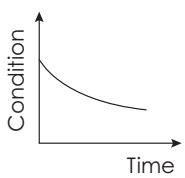
b. CO_2 is reduced to carbohydrates.

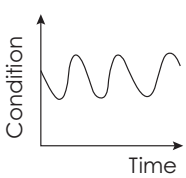
c. The light phase of photosynthesis occurs in stroma and the dark phase in grana.

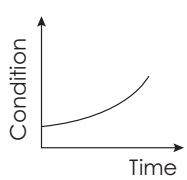
d. The light phase of photosynthesis occurs in grana and the dark phase in stroma.

15. Which of the following graph correctly shows the control of a condition by negative feedback mechanism?

a. 

b. 

c. 

d. 

SECTION - B : EVERYDAY SCIENCE

16. Match column I with Column II and choose correct option for this.

Column I	Column II
i. Superior vena cava	p. Carries deoxygenated blood to the lungs
ii. Inferior vena cava	q. Carries oxygenated blood from the lungs
iii. Pulmonary artery	r. Brings deoxygenated blood from the lower parts of body to the right atrium
iv. Pulmonary vein	s. Brings deoxygenated blood from the upper parts of body to the right atrium

a. i-q, ii-s, iii-r, iv-p
b. i-s, ii-p, iii-q, iv-r
c. i-s, ii-r, iii-p, iv-q
d. i-s, ii-p, iii-r, iv-q

17. Following are the statements made on two different harmones. Identify X and Y respectively.

"X is a peptide hormone and is derived from a preprohormone precursor that is synthesized in the hypothalamus and is stored in vesicles at the posterior pituitary".

"Y is made in magnocellular neurosecretory cells of the supraoptic and paraventricular nuclei of the hypothalamus and is stored in herring bodies at the axon terminals in the posterior pituitary".

a. Testosterone and androsterone
b. Progesterone and estradiol
c. Vasopressin and oxytocin
d. Cortisone and corticosterone

18. A boy touches a hot iron by mistake, he immediately withdraws his hand. Which of the following best explains the role of the relay neurone in this process?

I. It releases neurotransmitters to transmit the nerve impulses.
II. It transmits nerve impulses to the brain so that the movement of the arm can be started.
III. It transmits nerve impulse from sensory neuron to the motor neurone.

a. I and II
b. Only II
c. Only III
d. I, II and III

19. Once Jiya and her younger brother were stuck in their society lift. Jiya observed that her brother's face became pale and his heartbeats started beating very fast. Jiya's brother looked pale because :

I. Of secretion of adrenaline hormone.
II. Whenever there is a secretion of adrenaline in the blood flow during any type of stressed condition, the blood supply to the skin and to the digestive system is reduced.
III. Whenever there is a secretion of adrenaline in the blood flow during any type of stressed condition, the blood supply to the skin and to the digestive system is increased.

a. Both I and III
b. Only II
c. Only III
d. Both I and II

20. There are two pumpkins 'A' and 'B'. Their initial volumes were $10cm^3$ and $20cm^3$ respectively. After time 't', the two pumpkins A and B grow to raise the final volumes to $15cm^3$ and $25cm^3$. After calculation, it was observed that:

    a. 'A' has relatively faster growth rate than pumpkin 'B'.

    b. 'B' has relatively faster growth rate than pumpkin 'A'.

    c. Relative growth rate of both the pumpkins are equal.

    d. Relative growth rate of the two pumpkins cannot be compared.

SECTION - C : BRAINBOX

21. Which of the following correctly describes the difference between the control of the human body by the endocrine system and that of by, the nervous system?

    I. Hormones can have multiple target tissues but nerve impulses can be synapsed to multiple neurons.

    II. Hormones are transported by the blood while nerve impulses are transmitted through neurons.

    III. Hormones produce slow response, while neurons produce fast response.

    a. I and II b. Only II

    c. Only III d. I, II and III

22. When a child saw a snake in a play ground, he experienced sweating, increased breathing rate and increased heart beat. What is the most possible reason for his restlessness?

    a. Increase in the amount of GnRH in his blood.

    b. Increase in the amount of adrenaline hormone in his blood.

    c. Decrease in the amount of estrogen hormone in his blood.

    d. He was just scared of the snake biting him due to increase in insulin hormone in his blood.

23. Khushi performed an experiment as follows:

    I. She plucked a leaf from a green plant.

    II. She destarched that leaf by keeping it in dark for 3-4 days.

    III. She covered the leaf partly on one side by a black paper.

    IV. She kept the experimental leaf in the sunlight and in the dark alternatively.

    But she did not get the correct result because :

    a. All steps are wrong.

    b. Steps I, II and III are wrong.

    c. Step IV is wrong.

    d. Steps II & IV are wrong.

24. Which one of the following statement in regard to the excretion by human kidney is correct?

    a. Ascending limb of loop of Henle is impermeable to electrolytes.

    b. Descending limb of loop of Henle is impermeable to water.

    c. Distal convoluted tubule is incapable of reabsorbing HCO_3.

    d. Nearly 99% of the glomerular filtrate is reabsorbed by the renal tubules.

25. Which of the following is correct about the sensory receptors and their location in the body?

I. Gustatoreceptors : Located in the taste buds on the tongue and other parts of the buccal cavity.

II. Thermoreceptors : Located in the skin.

III. Olfactoreceptors : Located in olfactory epithelium in the nasal cavities.

IV. Phonoreceptor : Located in the inner ear.

V. Statoreceptors : Located in the inner ear.

VI. Tangoreceptors: Tactile or touch receptors present in the skin.

VII. Pain and Pressure receptors : Located in the skin and deeper tissues.

a. I, II, III, IV and VI

b. II, III, IV and VI

c. I, II, III, IV, V , VI and VII

d. III, IV, V and VII

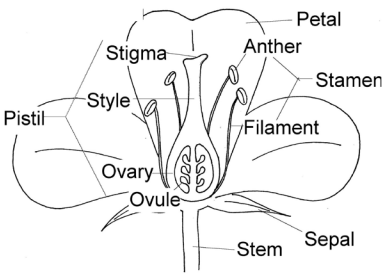
Darken your choice with HB pencil

1.	(a) (b) (c) (d)	8.	(a) (b) (c) (d)	15.	(a) (b) (c) (d)	22.	(a) (b) (c) (d)
2.	(a) (b) (c) (d)	9.	(a) (b) (c) (d)	16.	(a) (b) (c) (d)	23.	(a) (b) (c) (d)
3.	(a) (b) (c) (d)	10.	(a) (b) (c) (d)	17.	(a) (b) (c) (d)	24.	(a) (b) (c) (d)
4.	(a) (b) (c) (d)	11.	(a) (b) (c) (d)	18.	(a) (b) (c) (d)	25.	(a) (b) (c) (d)
5.	(a) (b) (c) (d)	12.	(a) (b) (c) (d)	19.	(a) (b) (c) (d)		
6.	(a) (b) (c) (d)	13.	(a) (b) (c) (d)	20.	(a) (b) (c) (d)		
7.	(a) (b) (c) (d)	14.	(a) (b) (c) (d)	21.	(a) (b) (c) (d)		

Chapter
7

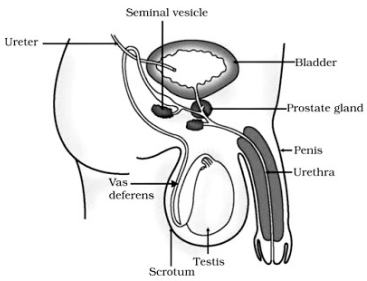
Reproduction in Plants and Animals

- Reproduction is the process by which a living organism is able to produce new individuals of its own kind.
  - Reproduction involves the creation of DNA copy. The process of DNA copying leads to variations.
  - Organisms reproduce in two ways - sexually and asexually.
  - Plants reproduce asexually by budding, binary fission, multiple fission, fragmentation, vegetative propagation, etc.

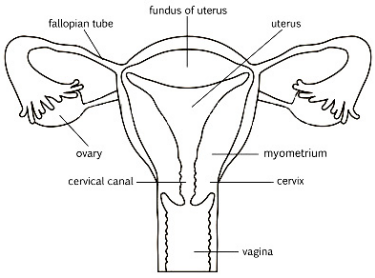


  - Flowering plants reproduce sexually with help of flower. Flower is known as reproductive organ in plants.
  - The reproductive organs in male and female human are different.

Male Reproductive System



Female Reproductive System

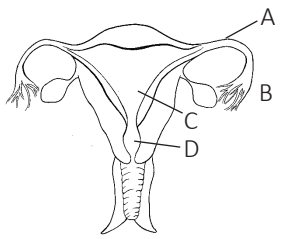


SECTION - A : SCIENTIFIC REASONING

1. 'In a bisexual flower, inspite of young stamens being removed artificially, the flower produces fruit.' What is the suitable explanation for this statement?
   a. The pistil is intact.
   b. Cross- pollination results in fertilization.
   c. Both a and b.
   d. The given statement is incorrect.

2. Read the given statements.
   I. The placenta allows exchange of materials between the mother and the fetus.
   II. Antibodies cannot cross the placenta from the mother to the fetus.
   III. The placenta secretes pregnancy hormones required for supporting fetal growth and metabolic changes in the mother during pregnancy.
   IV. The fetal part of the placenta consists of the cells of the chorion which produce projections called chorionic villi.
   Which of the given statements are correct?
   a. I & II b. I, II & III
   c. I, III & IV d. II, III & IV

3. Observe the given diagram of a female reproductive system and name the parts labelled as A, B, C and D.



	A	B	C	D
a	Fallopian tube	Ovary	Uterus	Cervix
b	Oviduct	Fallopian tube	Uterus	Cervix
c	Ovary	Cervix	Uterus	Oviduct
d	Fallopian tube	Cervix	Uterus	Oviduct

4. Many organisms reproduce asexually. Which of the following is not correctly matched?

	Organism	Modes of Reproduction
a.	Rhizopus	Spore formation
b.	Paramecium	Binary fission
c.	Planaria	Regeneration
d.	Leishmania	Budding

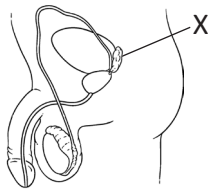
5. Which of the following is not a method of contraception?
   a. IUCD b. OCs
   c. Vasectomy d. IVCD

6. Ritu studied the sexual reproduction in some plants. She wrote some statements. Which of this is correct?
   a. Carpel is a part of androecium.
   b. Polar nuclei fuse to form diploid secondary nucleus.
   c. Secondary nuclei may form a diploid polar nucleus prior to fertilisation.
   d. Synergids have filiform apparatus that guides the energy of pollen tube into the nucellus.

7. Which one of the following is a bacterial STD?
   a. HIV b. Syphilis
   c. HPN d. Hepatitis B

8. Micro propagation or tissue culture is a technique of propagating plants by culturing cells or tissues from growing tips of plants in a culture medium. Which one of the following can be propagated by this method?
   a. Begonia b. Chrysanthemum
   c. Peperomia d. Asparagus

9. What is the function of 'X' marked in the given diagram of a male reproductive system?



   a. It secretes alkaline fluids.
   b. It stores the sperms temporarily and secretes seminal fluids.
   c. It stores the sperms permanently.
   d. It secretes testosterone.

10. Colonies of yeast fail to multiply in water, but multiply in sugar solution. Which one of the following could be the possible reason for it?
   a. The concentration of the sugar solution in higher than that of the water.
   b. Breakdown of sugar increase the temperature of the medium which facilitate the process of reproduction.
   c. Yeast gets energy by the breakdown of sugar in sugar solution, and so they multiply successfully.
   d. Both a. and b.

11. Each ovule consists of a large oval shaped cell called the embryo sac. How many nuclei does a mature embryo sac contain?
   a. 2 b. 4
   c. 8 d. 12

12. In a tobacco plant, the male gametes have 24 chromosomes. What is the number of chromosomes in the female gametes and in the zygote respectively?
   a. 25 and 50
   b. 24 and 48
   c. 23 and 46
   d. 28 and 48

13. Riddhi compared two contraceptive methods used by women and tabulated it. Which of the following comparison is incorrect?

	Contraceptive Pills	Tubal ligation
a	Eggs are not released	Disrupts the movement of the egg to the uterus
b	Reversible	Reversibility is very poor and it requires major surgery
c	Most of the pills contain synthetic forms of female hormones	It can also cause hormonal imbalance.
d	Ovulation occurs	Ovulation does not occur

14. Meiosis and mitosis are types of cell divisions. Which of the following statement best describes mitosis?
   a. In mitosis, a single cell divides into two identical daughter cells.
   b. The major purpose of mitosis is for growth and to replace worn out cells.
   c. Mitosis plays an important part in the life cycle of most living things.
   d. All of these

15. During reproduction in a certain fungi, when hyphae fuse together, there is a fusion of cytoplasm, but the nuclei remains separate. What is this phenomenon known as?
   a. Syncytium b. Karyogamy
   c. Plasmogamy d. Fibroblast

SECTION - B : EVERYDAY SCIENCE

16. Riya wrote some characteristics of eelgrass and hydrilla flowers.

    I. They produce large number of pollens because most of them get lost by the flow of water.

    II. Their stigmas are large and feathery to catch pollens.

    III. The stalks of the pollinated flowers are usually very short.

    IV. The male flowers, when matured, get detached from the plant and float above the water surface.

    Which of the given statements are correct?

    a. II and IV
    b. III and IV
    c. I, II and IV
    d. I, II and III

17. A student selected a money plant and cut some pieces such that they contain at least one leaf. He cut out some other portions between two leaves. He dipped one end of all the pieces in water and observe over the next few days. He note down his observation. Which one of the following cannot be the correct observation?

    a. The piece of money plant stem with leaves grow and give fresh leaves.
    b. Leaves having leaf buds grow into new branches.
    c. The stem without a leaf grows new leaves.
    d. Both a. and b.

18. Variations are observed in the offsprings of sexually reproducing organisms but not in the offsprings of asexually reproducing organisms. Why?

    a. They are not genetically identical to their parents.
    b. They receive different sets of characters from their parents.
    c. Genes of both the parents are different.
    d. All of these

19. The doctor suggested a lady to go for hysterectomy. It is a surgical procedure to remove a woman's uterus. What are the possible changes which she would observe in her body after hysterectomy is done?

    a. She will stop having menstrual periods.
    b. She will be unable to get pregnant.
    c. Both a and b.
    d. She will not feel or experience any changes.

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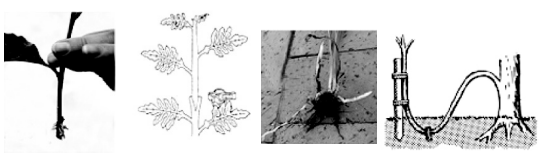
20. Observe the given diagrams of different modes of vegetative reproduction in plants.



'P' 'Q' 'R' 'S'

Identify P, Q, R & S and choose the correct option.

	P	Q	R	S
a.	Grafting	Layering	Stolon formation	Cutting
b.	Cutting	Grafting	Stolon formation	Layering
c.	Cutting	Grafting	Layering	Tuber
d.	Layering	Grafting	Cutting	Stolon formation

SECTION - C : BRAINBOX

21. Aman decides to study the impact of removing certain flower parts on fruit formation in a plant species. He chooses 3 separate plants that grow on the same land under uniform conditions.

He tabulate his data as:

Plant	Parts removed	Impact
Plant A	Petals	No impact
Plant B	Stigma	No fruits
Plant C	Anther	Production of fruit is decreased.

Based on the given data, which of the following can be concluded?

a. The plant species are self pollinated.
b. The plant species are pollinated only by cross pollination.
c. The plant species are either water or wind pollinated.
d. Pollen grains of plant 'A' is unable to fuse with the ovules.

22. What happens when the egg is not fertilised in the oviduct of a female reproductive system?

a. The unfertilised egg comes out through vagina on the same day.
b. The lining of uterus becomes thick and spongy.
c. The lining of uterus slowly breaks and comes out through the vagina as blood and mucous.
d. Both b and c.

23. A group of students learnt about tissue culture. They wrote the steps of tissue culturing. Read the steps.

I. The cells are placed in an artificial medium where they divide to form callus.
II. Removal of tissue form the growing tip of a plant.
III. The plant is placed in the soil to grow.
IV. The callus is transferred to another medium containing hormones for growth and differentiation.

Arrange these steps from starting to end.

a. IV, III, II, I
b. II, III, IV, I
c. II, I, IV, III
d. III, II, I, IV

24. The functions of different parts of a male reproductive system are given below. Which one of the following is an incorrect match?

	Parts of male reproductive system	Responsible for
a.	Testes	making testosterone and generating sperms
b.	Vas deferens	transporting mature sperms to the urethra
c.	Prostate gland	producing male sex hormone
d.	Epididymis	transportation and storage of sperm cells.

25. Read the given statements about female reproductive system.

I. The female germ-cells are responsible for the production of some hormones.

II. The ovaries of an infant girl does not contain germ cells.

III. The ovaries of an infant girl contains thousands of germ-cells.

IV. Only one egg is produced every month by one of the ovaries.

V. Only one egg is produced every month by both of the ovaries.

Which of the given statements are incorrect?

a. II and V

b. III and IV

c. I, III and IV

d. I, II and IV

Darken your choice with HB pencil

1.	a b c d	8.	a b c d	15.	a b c d	22.	a b c d
2.	a b c d	9.	a b c d	16.	a b c d	23.	a b c d
3.	a b c d	10.	a b c d	17.	a b c d	24.	a b c d
4.	a b c d	11.	a b c d	18.	a b c d	25.	a b c d
5.	a b c d	12.	a b c d	19.	a b c d		
6.	a b c d	13.	a b c d	20.	a b c d		
7.	a b c d	14.	a b c d	21.	a b c d		

Chapter

8

Heredity and Evolution

- Evolution is the generation of new species as a result of variations brought due to the sexual reproductions and errors in DNA copying.
  - Both the maternal and the paternal DNA influence each trait of an individual, hence each trait has two versions; one from the mother and the other from the father.
  - All traits are not inherited genetically. Only those traits transfer through successive generations, whose genes are present in the germ cells.
  - Fossils are the preserved remains or imprints of plants, animals and other organisms buried under the earth thousands or millions of years ago.
  - The process by which genetic information is transmitted from parents to the offsprings is known as heredity.
  - Speciation is the term used to define the origin of a new species in a given area. This might occur by four processes: allopatric speciation, peripatric speciation, sympatric speciation, parapatric speciation.

SECTION - A : SCIENTIFIC REASONING

1. Classification of species is done on the basis of following criterias except for:
   a. Cell design – nucleated or non-nucleated.
   b. Unicellular or multi-cellular.
   c. Specialisation of cell types and tissues – autotrophs or heterotrophs.
   d. Length of the limbs.

2. In a progeny of 112 individuals, find the ratio of homozygous dominant, heterozygous and homozygous recessive in F2, if the cross obeys Mendelian ratio
   a. 24:48:24 b. 28:56:28
   c. 24:56:24 d. 28:48:28

3. If trait 'M' exists in 50% and trait 'O' exists in 10% of a population of an asexually reproducing species and trait 'N' exists in 20% and trait 'P' exists in 25% of the same population. Then the trait which have arisen earlier is:
   a. Trait 'M' b. Trait 'N'
   c. Trait 'O' d. Trait 'P'

4. Haploids are able to express both recessive and dominant alleles/mutations because there are:
   a. Many alleles for each gene.
   b. Two alleles for each gene.
   c. One allele for each gene.
   d. Three alleles in a gene.

5. Genetic drift is the elimination of:
   a. Genes of some original characteristics of a species due to epidemics.
   b. Genes of some mutated species.
   c. Some chromosomes.
   d. Few individuals of the species.

6. Which of the following is/are correct about Down's syndrome?
   I. A 21st extra chromosome causes Down's syndrome.
   II. It is a chromosomal disorder caused by the presence of all or part of an extra 21st chromosome.
   III. It is also known as trisomy 21.
   a. I and II b. I and III
   c. I, II and III d. Only II

7. The egg of an animal contains 10 chromosomes, of which one is 'X' chromosome. How many autosomes would be there in the karyotype of this animal?
   a. 20 b. 9
   c. 8 d. 18

8. Study of evolution of human being indicates that:
   a. There is no change because of environmental changes.
   b. The difference in colour, size and looks is the result of environmental changes.
   c. Environmental changes sometime cause changes.
   d. New species eliminate the existing species.

9. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progenies are all bare violet flowers, but almost half of them were short. This suggests that the genetic make-up of tall parent can be depicted as:
   a. TTWW
   b. TTww
   c. TtWW
   d. TtWw

10. Man and chimpanzee show a close relationship. Which among the following helps in determining it?
    a. Their DNA
    b. The number and sequence of nucleotides in the DNA segment of a particular gene of both of them.
    c. Their RNA
    d. The number and sequence of nucleocides in the DNA segment of a particular gene of both of them.

11. Two species of a goat, A & B breed in the month of March and October respectively. They cannot interbreed because of :
    a. temporal isolation.
    b. behavioural isolation.
    c. physiological isolation.
    d. All of the these.

12. The features of fossils help in study of evolution. Which of the following is not a feature of fossil that help in study of evolution?
    a. Fossils represent modes of preservation of ancient species.
    b. Fossils establish evolutionary traits among organisms and their ancestors.
    c. Fossils establish the time period in which organisms lived.
    d. Fossils describe the physical features of the organisms.

13. Which one of the following is an example of a vestigial organ?
    a. Nictitating membrane in eye.
    b. Coccygeal vertebra of man.
    c. Ear lobe.
    d. Only a and b

14. The evolution of a species can be considered as the sum total of adaptive changes of the species preserved by
    a. The laws of demand evolution
    b. Evolution
    c. Mass conservation
    d. Natural selection

15. Wings of birds and bat look similar. Choose the incorrect statemnt about them.
    a. Both have wings for a common purpose.
    b. Both have a common ancetrial origin.
    c. The wings of bats and birds are analogues as wings.
    d. The wings of bats and birds are homologous as forelimbs.

SECTION - B : EVERYDAY SCIENCE

16. What is the probability that the male progeny will be a boy?
    a. 50%
    b. 56%
    c. 60%
    d. It varies

17. What is the effect of DNA copying which is not accurate on the reproduction process?
    I. DNA copying which is not accurate will give rise to new variations/mutations.
    II. These variations/mutations will be transferred to the offspring during reproduction.
    III. It forms a condensed form of chromatin fibre consisting of DNA molecule.
    a. I and II
    b. II and III
    c. I, II and III
    d. Only II

18. Which of the following incorrectly shows the difference between inherited traits and acquired traits?

I. Inherited traits are those which occur due to a property of the genes. Acquired traits on the other hand, are the traits which are obtained by the organism during its course of life.

II. Inherited traits are passed down from one generation to the next or are inherited. Acquired traits do not occur due to changes in the genes.

III. Example of inherited trait is hair colour. Example of acquired trait is ear piercing.

a. I and III
b. II and III
c. Only I
d. None of the above

19. A student stated, "In rabbits, the allele for pink eye colour is dominant over the allele for black eye colour". What does this mean in a rabbit population?

a. Rabbit with black eyes are less successful breeders.
b. Most of the rabbits have pink eyes.
c. When a pink-eyed rabbit breeds with a black-eyed rabbit, the offsprings will have blue eyes.
d. Black-eyed rabbits are born only when two black-eyed rabbits breed.

20. "A man with blood group 'A' marries a women with blood group 'O' and their daughter has blood group 'O'. Which of the following statement is inferred incorrectly?

a. Gene for blood group 'A' is dominant over gene for blood group 'O'.
b. Gene for blood group 'O' is dominant over gene for blood group 'A'.
c. Genotype of his daughter is 'OO'.
d. Genotype of the man is 'AO'.

SECTION - C : BRAINBOX

21. Albiunism is known to be due to an autosomal recessive mutation. The first child of a couple with normal skin pigmentation was an albino. What is the probability that their second child will also be an albino?

a. 100%
b. 75%
c. 25%
d. 50%

22. Some dinosaurs had feathers although they could not fly but birds have feathers that help them to fly. In the context of evolution this means that :

a. Reptiles have evolved from birds.
b. Birds have evolved from reptiles.
c. There is no evolutionary connection reptiles and birds.
d. Feathers are homologous structures in both the organisms.

23. Anushka wrote some characteristics of genes as :

I. Genes are specific sequence of bases in a DNA molecules.

II. A gene does not code for proteins.

III. In individuals of a given species, a specific gene is located on a particular chromosome.

IV. Each chromosome has only one gene.

Which of the given statements are not correct?

a. I and II
b. I and III
c. I and IV
d. II and IV

24. Study the given diagrams.
In what ways they are similar?


Pitcher


Cactus


Venus

a. They are insectivorous plants.
b. Their leaves show homology.
c. Their leaves show analogy.
d. They are not similar.

25. Two pea plants, one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds produce F_1 progeny that have round yellow (RrYy) seeds. When F_1 plants are selfed, the F_2 progeny will have new combination of characters.

I. Round, yellow
II. Round, green
III. Wrinkled, yellow
IV. Wrinkled, green

a. I and II
b. I and IV
c. II and III
d. I and III

Darken your choice with HB pencil

1. (a) (b) (c) (d)	8. (a) (b) (c) (d)	15. (a) (b) (c) (d)	22. (a) (b) (c) (d)
2. (a) (b) (c) (d)	9. (a) (b) (c) (d)	16. (a) (b) (c) (d)	23. (a) (b) (c) (d)
3. (a) (b) (c) (d)	10. (a) (b) (c) (d)	17. (a) (b) (c) (d)	24. (a) (b) (c) (d)
4. (a) (b) (c) (d)	11. (a) (b) (c) (d)	18. (a) (b) (c) (d)	25. (a) (b) (c) (d)
5. (a) (b) (c) (d)	12. (a) (b) (c) (d)	19. (a) (b) (c) (d)	
6. (a) (b) (c) (d)	13. (a) (b) (c) (d)	20. (a) (b) (c) (d)	
7. (a) (b) (c) (d)	14. (a) (b) (c) (d)	21. (a) (b) (c) (d)	

Chapter

9

Light - Reflection, Refraction and Human Eye

- Optics is the branch of physics which involves the behaviour and properties of light, including its interactions with matter and the construction of instruments that use or detect it. Optics usually describes the behaviour of visible, ultraviolet, and infrared light.
    - Reflection of light: when light falls on a smooth surface, a part of it gets reflected.
    - The size of an image formed by a plane mirror is the same as that of the object. This is not always the case with spherical mirrors. A convex mirror forms an image that is smaller than the object. You might have noticed this in the rear-view mirrors of vehicles. The size of the image formed by a concave mirror can be smaller than, equal to or larger than the size of the object, depending on where the object is placed in front of the mirror.
    - Refraction of light: When light travelling in a medium (such as air) enters another medium (such as water), it generally bends at the surface separating the two media.
    - When light splits into its coloured components, and the components are collected in such a way that different colours occupy different regions of space and the collection is called spectrum.
    - In the human visual system, the eye receives physical stimuli in the form of light and sends those stimuli as electrical signals to the brain, which interprets the signals as images.

SECTION - A : SCIENTIFIC REASONING

1. A concave mirror and a converging lens (with refractive index 1.5), both have a focal length of 3 cm when in air. When they are in water, their focal lengths will be :

   a. greater than 3 cm.
   b. less than 3 cm.
   c. equal to 3 cm.
   d. equal to 6 cm.

2. An object is placed on the left side of a positive lens and the real image is formed on the right side of the lens. If the object is moved slightly to the right, the image will _____.

   a. not move
   b. move to the left
   c. move to the right
   d. move up

3. In torches, search lights and headlights of vehicles, the bulb is placed:

   a. Between the pole and focus of the reflector.
   b. Between focus and centre of curvature of the reflector.
   c. At the centre of curvature of the reflector.
   d. Very near to the focus of the reflector.

4. The crystalline lens of human eye is a converging lens. The focal length of eye lens increases when eye muscles :

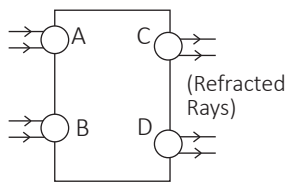
   a. are relaxed and the lens becomes thicker.
   b. are relaxed and the lens becomes thinner.
   c. contract and the lens becomes thinner.
   d. contract and the lens becomes thicker.

5. "A person needs a lens of power + 2.5 D for correction of his vision." Rohan concluded about the eye defect and solution for it as given in table . Which one is the correct information about the person?

	Eye Defect	Corrective Lens	Focal length of Corrective lens
a.	Myopia	Concave lens	– 0.25 m
b.	Myopia	Convex lens	+ 0.25 m
c.	Hyper metropia	Convex lens	+ 0.4 m
d.	Hyper metropia	Concave lens	– 0.4 m

6. Observe the given diagram. The incident rays enters in the box through holes A & B and emerges out through C & D. There is something inside the box which helped the light rays to come out. What could be that material in the box?

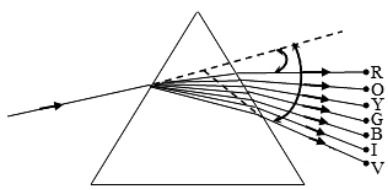
   a. A prism
   b. A lens
   c. A plane mirror
   d. A rectangular glass slab



7. Sun rays converge at a point 25 cm in front of a concave mirror. Where should an object be place so that size of its image is equal to the size of the object?

   a. 25 cm infront of a concave mirror.
   b. 50 cm infront of a concave mirror.
   c. Between 25 and 50 cm infront of a concave mirror.
   d. 100 cm in front of a concave mirror.

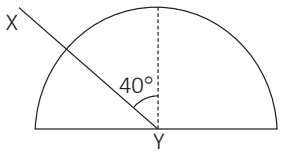
8. Observe the given diagram showing scattering of light through prism.



Which of the following statement is correct about it?

a. The colours in the order of decreasing speed are V > I > B > G > Y > O > R.
b. The colours in the order of decreasing deviation are R > O > Y > G > B > I > V.
c. The colours in the order of increasing frequency are R < O < Y < G < B < I < V.
d. The colours in the order of increasing wavelength are R < O < Y < G < B < I < V.

9. A ray of light passing through a semi-circular glass slab from air is shown here. Study the given diagram and choose the statement which is incorrectly stated about it.



a. The wavelength of light rays increases when they enter the glass slab.
b. The speed of light rays decreases when they enter the glass slab.
c. The frequency of light remains same when is enter the glass slab.
d. There is no change in the direction of the light rays at point 'X', because light rays incident on semicircular glass slab at 90°.

10. Choose the correct option in case of convex lens.

	Object position	Image Position	Image size	Nature of image
a.	At 2 F_1	At 2 F_1	Same size	Virtual and erect
b.	Beyond 2 F_1	At F_2	Dimi-nished	Virtual and erect
c.	At F_1	At infinity	Dimi-nished	Real and Inverted
d.	Between F_1 & 2 F_1	Beyond 2 F1	Enlarged	Real and Inverted

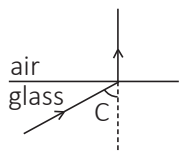
11. The danger signals installed at the top of tall buildings and on traffic lights are red in colours. These can easily be seen from a distance. Among all the 7 colours of light, the red light :
a. Is scattered the most by smoke or fog.
b. Is scattered the least by smoke or fog.
c. Is absorbed the most by smoke or fog.
d. Has the maximum speed as compared to other colours.

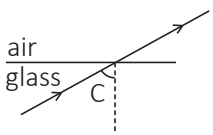
12. Two lenses of powers + 15 D and –5 D are in contact with each other forming a combination of lenses. A body of size 3 cm is placed at 30 cm from this combination of lenses. What is the size of the image formed?
a. 1.5 cm b. – 1.5 cm
c. 3 cm d. – 3 cm

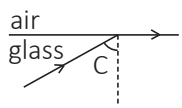
13. Four students P, Q, R & S were asked to take three sets of observation for tracing the path of a ray of light through a glass slab. The choices of different angles of incidence made by them were as :
(P) – 10°, 15°, 20° (Q) – 15°, 20°, 25°
(R) – 30°, 45°, 60° (Q) – 70°, 75°, 80°
Which one of the student would get the best result?
a. P b. Q
c. R d. S

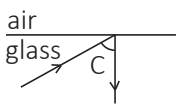
14. Which one of following factor does not affect the angle of deviation of a light ray, while passing through a prism?
a. Refractive index of the prism material.
b. Refractive angle of the prism.
c. The angle of incidence of the ray.
d. Dimensions of the prism.

15. The critical angle for a glass/air boundary is 'C'. Which of the following diagram shows the correct path of the light ray?

a. 

b. 

c. 

d. 

SECTION - B : EVERYDAY SCIENCE

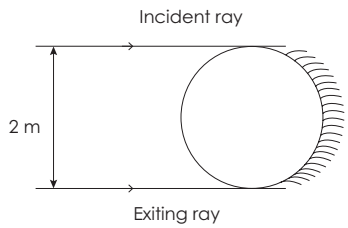
16. Which of the following lens would you prefer to use while reading small letters of a dictionary?
    a. Convex lens of focal length 50 cm
    b. Convex lens of focal length 5 cm
    c. Concave lens of focal length 5 cm
    d. Concave lens of focal length 50 cm

17. An optician, while testing the eyes find the vision of a patient to be 6/6. What does this mean?
    a. The person can read the letters from 6 m which the normal eye can from 9 m.
    b. The person can read the letters of 6 inches from a distance of 9 m.
    c. The person can read the letters of 9 inches from a distance of 6 m.
    d. The person can read the letters from 9 m which the normal eye can from 6 m.

18. When two plane mirrors are placed parallel and facing each other and an object is kept in between them, we get infinite images but actually only a few images are visible. It happens because :
    a. The intensity of the image is increased after each reflection.
    b. The intensity of the image is decreased after each reflection.
    c. The intensity of the image is always constant.
    d. The length of plane mirrors are small.

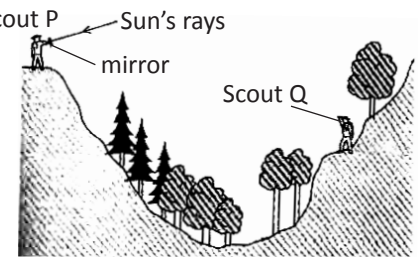
19. A boy with normal near point (25 cm) reads a book with small print using a magnifying glass, a thin convex lens of focal length 5 cm .What are the closest and the farthest distances at which he can read the book when viewing through the magnifying glass?
    a. – 5 cm, – 4.2 cm
    b. – 4.2, – 5 cm
    c. – 6.3 cm, – 3.2 cm
    d. 5 cm, –3.2 cm

20. Given figure shows, a transparent cylinder of radius 2 m having a mirrored surface on its right half. A light ray travelling in air is incident on the left side of the cylinder. The incident ray and the exiting ray are parallel and at a distance of 2 m. The refractive index of the material is:
    a. 1.33
    b. 1.93
    c. 2
    d. 1.51

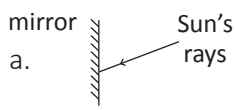


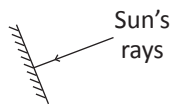
SECTION - C : BRAINBOX

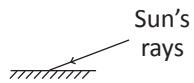
21 Scout P signals to scout Q on the other side of a valley by using a mirror to reflect the Sun's rays.

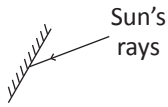


Which mirror position would allow the Sun's rays to be reflected to scout Q?

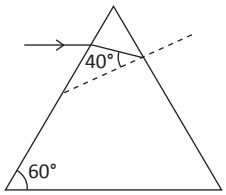
a. 

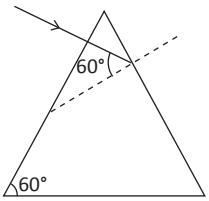
b. 

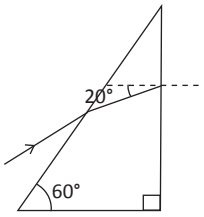
c. 

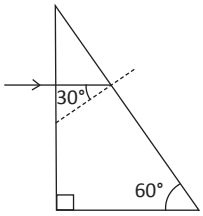
d. 

22. Four prisms are made of the same type of glass at a critical angle of 42. A ray of light is passed into each prism. Which ray will be totally passed through each prism. Which ray will be totally internally reflected within the prism?

a. 

b. 

c. 

d. 

23. 'Size of image of an object by a mirror having a focal lengh of 20 cm is observed to be reduced to 1/3rd of its size'. Which of the following statements is correctly deducted from the given information?

a. To acheive this, the object should be placed at a distance of 80 cm from the concave mirror.

b. To achieve this, the object should be placed at a distance of 40 cm from the pole of convex mirror.

c. An erect, virtual and diminished image is obtained if convex mirror is used.

d. All of these

24. A teacher gives a concave mirror to a student for determination of the focal length by focussing a distant object. She tells that its focal length lies in the range of 15-20 cm. She places the mirror on the optical bench at 25.2 cm mark. For quickly getting a sharp image on the screen, where should the student should adjust the position of screen between the marks?

a. 10.2 and 45.2 cm

b. 5.2 and 10.2 cm

c. Either a. or b. depending on which end of optical bench is towards the object.

d. 15 and 25.2 cm

25. A boy views an aeroplane in the sky through a lens. He sees an inverted image. Which of the following statements is/are correct:

I. The lens is a concave lens.
II. The image is diminished.
III. The image is real.

a. I only

b. I and III only

c. II and III only

d. I, II and III

Darken your choice with HB pencil

1.	a b c d	8.	a b c d	15.	a b c d	22.	a b c d
2.	a b c d	9.	a b c d	16.	a b c d	23.	a b c d
3.	a b c d	10.	a b c d	17.	a b c d	24.	a b c d
4.	a b c d	11.	a b c d	18.	a b c d	25.	a b c d
5.	a b c d	12.	a b c d	19.	a b c d		
6.	a b c d	13.	a b c d	20.	a b c d		
7.	a b c d	14.	a b c d	21.	a b c d		

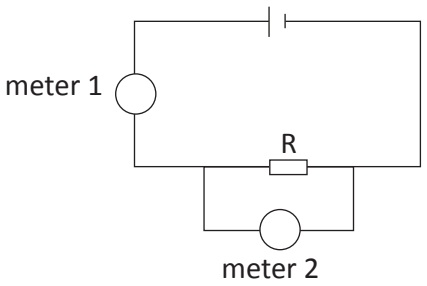
Chapter
10

Electricity

- Electricity develop on bodies. When they are rubbed with each other it is called frictional electricity. It is also called static electricity as the charges so developed on a body, cannot flow from one point to some other point.
  - Electric current: It is defined as the rate of flow of electric charge through any section of a wire. The direction in which the flow of positive charge gives the direction of conventional current. Since the flow of current is attributed to the flow of electrons, the direction of the electronic current is opposite to that of the conventional current.
  - In a metallic conductor, free electrons are the carriers of electricity and hence, electrons constitute the electric current 6.25×10^{18} electrons crossing per second through any section of a conductor, Which give rise to a current of 1 ampere.
  - Ohm's Law : It states that the physical conditions (temperature, mechanical strain,etc.) remain unchanged and the current flowing through a conductor is always directly proportional to the potential difference across its two ends.
  - The resistance of a conductor implies the opposition, which the conductor offers to the flow of charge through it. When a potential difference is applied across a conductor, an electric field is set up across its two ends. Due to this, the free electrons get accelerated. As the electrons move, they collide against the cations and their motion is thus opposed. The opposition offered by the atoms, as a result of which the electrons are slowed down and this opposition offered to the electrons is termed as the resistance of the conductor.

SECTION - A : SCIENTIFIC REASONING

1. The circuit shown is used to measure the resistance of resistor R.

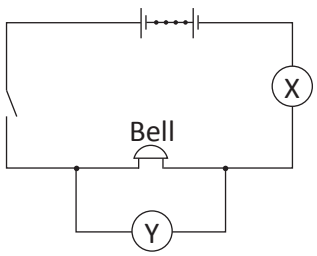


The resistance is calculated from the readings on meter 1 and 2.

What are the units for the meter readings?

	meter 1	meter 2
a.	A	Ω
b.	A	V
c.	V	A
d.	V	Ω

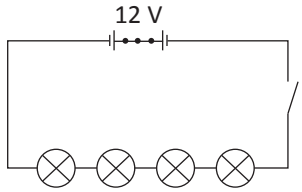
2. A student sets up a circuit to measure the potential difference across a bell.



In order to do this, should the student use an ammeter or a voltmeter and in which position, X or Y, should the meter be placed?

	meter	position
a.	ammeter	X
b.	ammeter	Y
c.	voltmeter	X
d.	voltmeter	Y

3. Four lamps are connected in a circuit as shown in the diagram.



Each lamp is designed to operate at 12 V.

The circuit is now switched on.

Which statement is correct?

a. Each lamp can be switched off independently.

b. If one lamp breaks all the others will stay alight.

c. The current is the same in all the lamps.

d. The lamps will all light at normal brightness.

4. Which of the following statements is correct?

a. A fuse is included in a circuit to prevent the current becoming too high.

b. A fuse should be connected to the neutral wire in a plug.

c. An electric circuit will only work if it includes a fuse.

d. An earth wire is needed to prevent the blowing of the fuse.

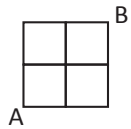
5. Twelve identical metal rods are joined as shown in figure. Each rod has a resistance of 1 Ω. Find the equivalent resistance across A and B.

a. 2/3 Ω

b. 1 Ω

c. 3/2 Ω

d. 5/2 Ω



6. The ratings of a heater are 200V, 500W. If it is connected to 180 V supply, what will be the power dissipated by the heater?

a. 550 W b. 500 W

c. 450 W d. 81 W

7. If the current 'I' through a resistor is increased by 100% at a constant temperature. The increase in power dissipated will be

a. 100%

b. 200%

c. 300%

d. 50%

8. If a man has five resistors each of value $\frac{1}{5}$ Ω, then the maximum resistance he can obtain by connecting them is:

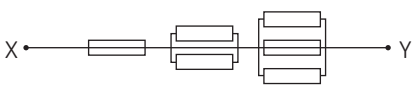
a. 1 Ω

b. 5 Ω

c. 1/2 Ω

d. 2/5 Ω

9. A network of resistors, each of resistance R, is shown in figure. The overall resistance, measured between X and Y, is 33 kΩ. What is the value of R?



a. 18 k Ω b. 16 k Ω

c. 36k Ω d. 24 k Ω

10. A wire is cut into 4 pieces, which are put together by sides to obtain one conductor. If the original resistance of wire was R, then what is the resistance of the bundle?

a. R/4

b. R/8

c. R/16

d. R/32

11. The table shows the voltage and current ratings for four electric heaters.

Which heater has the least resistance?

	voltage / V	current / A
a.	110	5.0
b.	110	10.0
c.	230	5.0
d.	230	10.0

12. An electric power tool is being used outdoors in rain.

What is the greatest hazard to the user?

a. The cable gets hot and causes burns.

b. The circuit-breaker cuts off the current.

c. The current passes through water and causes a shock.

d. The water dissolves the plastic covering of the wire.

13. An electric bulb rated 220 V, 60 W is working at full efficiency. Another identical bulb is connected in the same circuit having power supply of 220 V.

Which of the following statements are correct regarding this electric circuit?

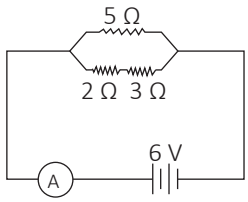
a. If both the bulbs are connected in series, then the total power consumption will be 60 W.

b. If both the bulbs are connected in parallel, then the total power consumption will be 60 W.

c. If both the bulbs are connected in parallel then, the total power consumption will be 120 W.

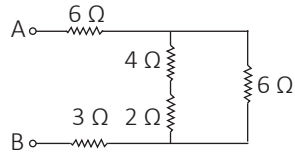
d. If only one bulb is connected then the total power consumption will be 30 W.

14. Observe the given circuit diagram and calculate the potential difference across 3 Ω resistance.



a. 2.5 V
b. 1.6 V
c. 2.6 V
d. 3.6 V

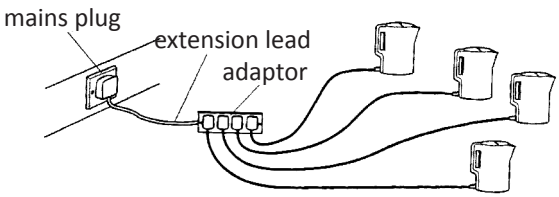
15. Calculate the equivalent resistance in the given circuit diagram between points A & B.



a. 2 Ω
b. 12 Ω
c. $\frac{12}{7}$ Ω
d. 9 Ω

SECTION - B : EVERYDAY SCIENCE

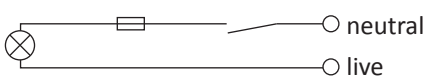
16. The diagram shows four electric kettles plugged into a 4-way adaptor. An extension lead connects the adaptor to a single plug.

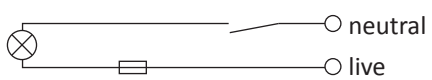


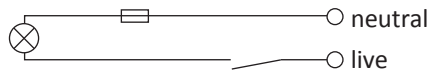
If the mains plug works without a fuse, why is this use of the adaptor dangerous?

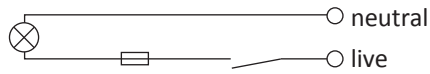
a. The heating elements in the kettles will overheat.
b. The extension lead connecting the adaptor to the mains plug will overheat.
c. The leads connecting the kettles to the adaptor will overheat.
d. The water in the kettles will overheat.

17. Which circuit will be the safest to use?

a. 

b. 

c. 

d. 

18. An electric heater takes a current of 10 A. It is connected to the power supply using a wire which is designed to take 5 A. What is the danger regarding this situation?

a. The heater can explode.
b. The wire can explode.
c. The heater can become too hot and cause a fire.
d. The wire can become too hot and cause a fire.

19. Read the following statements and mark the correct option.

Statement 1: In parallel combination of electrical appliances, total power consumption is equal to the sum of the powers of the individual appliances.

Statement 2: In parallel combination, the voltage across each appliance is the same as required for the proper working of electrical appliance.

a. Only 1 is correct
b. Only 2 is correct

c. Both 1 and 2 are correct

d. Both 1 and 2 are incorrect

20. A room has two tube lights, a fan and a TV. Each tube light draws 40 W, the fan draws 80 W and the TV draws 60 W. On the average, the tube lights are kept on for five hours, the fan for 12 hours and the TV for eight hours every day. The rate for the electric energy is ₹3.10 per kWh. The cost of electricity used in this room in a 30-day month is

a. ₹169 b. ₹173.9

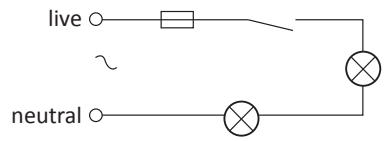
c. ₹171.12 d. ₹160

SECTION - C : BRAINBOX

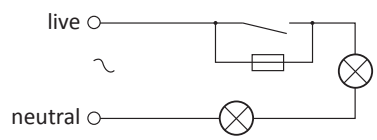
21. A fuse is used to protect electric circuits.

Which diagram shows the correct placement of fuse?

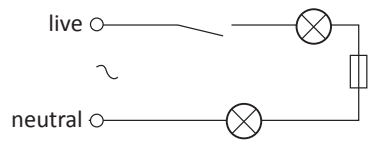
a.



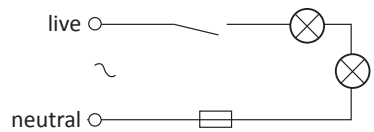
b.



c.



d.



22. Circuit-breakers are used with electrical appliances as safety devices.

Which description is correct for a circuit-breaker?

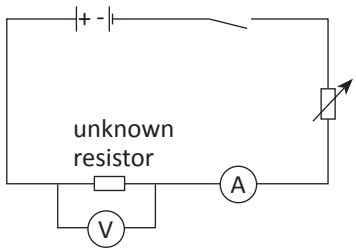
	Position	What happens
a.	connected to the live wire	melts
b.	connected to the live wire	operates on electromagnet
c.	connected to the casing of the appliance	melts
d.	connected to the casing of the appliance	operates on electromagnet

23. A 0 to 300 V voltmeter has limitingerror of 1% of full scale reading. The voltage measured by the instrument is 83 V. The percentage limiting error is:

a. 95% b. 4.85%

c. 3.62% d. 1.81%

24. A student sets up an experiment to find the resistance of an unknown resistor. The circuit used is shown.



The rheostat was adjusted several times and the current and voltage readings were taken.

The results obtained are shown in the table.

Current / A	Voltage / V
0.1	1.6
0.2	3.2
0.3	4.8
0.4	6.4
0.5	8.0
0.6	9.6

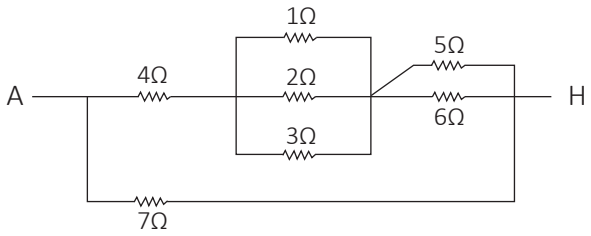
What is the value of the unknown resistance?

a. 0.6 Ω b. 1.6 Ω

c. 16 Ω d. 64 Ω

25. What is the equivalent resistance between A and H of resistance as shown in figure?

a. 3.56 Ω
b. 7 Ω
c. 14.26 Ω
d. 26.69 Ω



Darken your choice with HB pencil

1.	a b c d	8.	a b c d	15.	a b c d	22.	a b c d
2.	a b c d	9.	a b c d	16.	a b c d	23.	a b c d
3.	a b c d	10.	a b c d	17.	a b c d	24.	a b c d
4.	a b c d	11.	a b c d	18.	a b c d	25.	a b c d
5.	a b c d	12.	a b c d	19.	a b c d		
6.	a b c d	13.	a b c d	20.	a b c d		
7.	a b c d	14.	a b c d	21.	a b c d		

Chapter
11

Magnetic Effects of Electric Current

➡ The region around a magnet where its influence can be felt is called its magnetic field.

- Maxwell's right-hand thumb rule: Magnetic line of force is used to indicate the direction of the magnetic field. If a straight current-carrying wire is imagined to be held in the right hand with the thumb stretched along the direction of the current, then the direction of the magnetic field produced by the current is in the direction in which the fingers are curled
- Fleming's left-hand rule for the direction of force indicates that if the forefinger, second finger and the thumb of the left hand are stretched at right angles to each other, with the forefinger in the direction of the field and the second finger in the direction of the current, then the thumb indicates the direction of the force.
- The magnetic field lines are closed continuous loops extending through the body of the magnet. Outside the body of the magnet, the magnetic field lines run from the north pole to the south pole of the magnet.
- The tangent to the magnetic field line at any point gives the direction of magnetic field at that point. No two magnetic field lines can intersect each other. The magnetic field lines dilate laterally and, contract longitudinally.

SECTION - A : SCIENTIFIC REASONING

1. 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.

2. Which of the following is impossible in electromagnetism?
   a. Breaking a magnet in half, with one piece having only north pole and the other having only south pole.
   b. Breaking a charged conductor in half with one piece carrying positive charge and the other carrying negative charge.
   c. Detecting static electric charges with a compass.
   d. Detecting steady electric currents with a compass.

3. The magnetic field produced at the center of a circular wire is proportional to _____ and inversely proportional to _____.
   a. radius of the loop, current
   b. current, radius of the loop
   c. length of the conductor, current
   d. weight of the conductor, current

4. Charged ball is released from rest in a region of steady and uniform electric and magnetic fields which are parallel to each other. Here the ball will move in a:
   a. straight line b. circle
   c. helix d. cycloid

5. To convert an AC generator into DC generator-
   a. Split ring type commutator must be used.
   b. Split rings and brushes mut be used.
   c. A stronger magnetic field has to be used.
   d. A rectagular wire loop has to be used.

6. Which of the following process can magnetize a steel bar?
   I. Stroke the steel bar with a magnet.
   II. Insert the steel bar in a coil which is connected to an alternating current.
   III. Insert the steel bar in a coil which is connected to a direct current.
   a. I and II b. I and III
   c. II and III d. I, II and III

7. An α-particle of mass 6.65×10^{-27} kg is travelling at right angle to magnetic field with a speed of 6×10^{5} ms^{-1}. The strength of the magnetic field is 0.2 T.
   What is the acceleration of the α-particle?
   a. 5.77×10^{12} ms^{-2} b. 4.31×10^{12} ms^{-2}
   c. 2.73×10^{12} ms^{-2} d. 3.13×10^{12} ms^{-2}

8. A thin uniform ring of radius r carrying uniformly distributed charge q and m rotate about its axis with angular velocity w. The ratio of its magnetic moment and angular momentum is:
   a. qB/m b. qB/2m
   c. m/qB d. m/2qB

9. A length of wire carries a steady current. It is bent first to form a circular plane coil of one turn. The same length is now bent more sharply to give a double loop of smaller radius. The magnetic field at the centre caused by the same current is:

a. Four times
b. Half
c. Unaltered
d. None of these

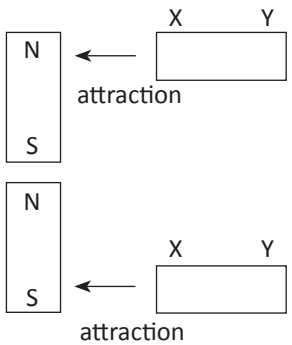
10. Which coil produces the strongest electromagnet for given flow of current?

a. 10 cm coil with 100 turns
b. 5 cm coil with 200 turns
c. 10 cm coil with 200 turns
d. 20 cm coil with 200 turns

11. A current-carrying ring is placed in a magnetic field. If the direction of the field is perpendicular to the plane of the ring, then:

a. There is no net force on the ring.
b. The ring may tend to contract.
c. The ring may tend to expand.
d. All of these

12. A metal rod XY is placed near a magnet. End X is attracted when it is placed near to the north pole of the magnet, and also when it is placed near to the south pole.



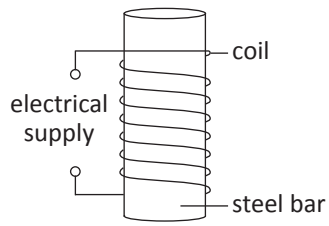
How does end Y behave when it is placed, in turn, near to the two poles of the magnet?

	Y near the north pole	Y near the south pole
a.	attraction	attraction
b.	attraction	repulsion
c.	repulsion	attraction
d.	repulsion	repulsion

13. Which object can affect the direction of a compass needle?

a. copper cooking pan
b. glass windows
c. steel-framed bed
d. wooden table

14. The apparatus below is used to demagnetise a steel bar.



Which type of electrical supply is used and what is done with the steel bar?

	supply	what to do with the steel bar
a.	a.c.	keep it inside the coil
b.	a.c.	slowly remove it from the coil
c.	d.c.	keep it inside the coil
d.	d.c.	slowly remove it from the coil

15. Choose the incorrect statement.

a. Fleming's right hand rule is a simple rule to know the direction of the induced current.
b. The right hand thumb rule is used to find the direction of magnetic field due to current carrying conductor.
c. The difference between DC and AC is that the DC always flows in one direction whereas AC reverses its direction periodically.
d. In India, the AC changes direction after every 1/20 seconds.

16. Rohit attaches one end of a string to a steel paper clip and the other end to a table. The string is very light. He then uses a magnet to attract it so the clip seems to float in air. However, when she lifts the magnet, the paper clip falls. What is the reason for this?

    a. the potential energy of the clip decreases.

    b. the gravitational force near the magnet increases.

    c. the magnetic properties of the clip decreases.

    d. the magnetic field strength near the clip decreases.

17. A magnet is inserted into the centre of a coil and an emf is induced across the coil. The magnitude of the induced current depends on :

    I. The diameter of the coil.

    II. The strength of a magnet.

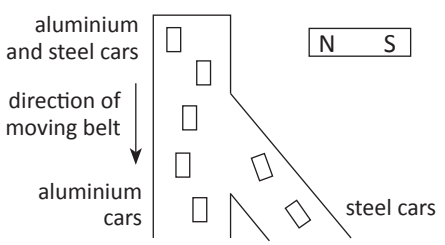
    III. The thickness of the wire of which the coil is made.

    a. I and II only b. I and III only

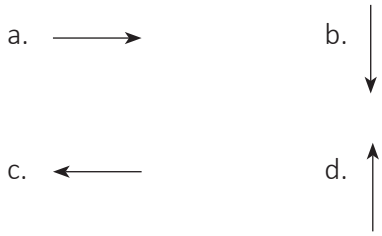
    c. II and III only d. I, II and III

18. A machine is designed to separate aluminium cars from steel cans using a magnet.

    The cans lie on a moving belt.



    Which arrow shows the direction of the magnetic force on the cans?



19. A student draws magnetic field lines of a field close to the axis of a current carrying circular loop. As he moves away from the centre of the circular loop, he observes that the lines keep on diverging. What could be the possible reason?

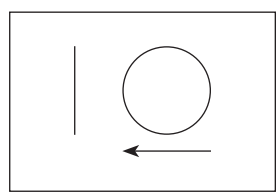
    a. Strength of the magnetic field decreases as distance increases.

    b. Strength of the magnetic field increases as distance increases.

    c. Degree of closeness of the lines of field decreases.

    d. Both a and c.

20. A coil is moving towards a straight long wire carrying a steady electric current. The wire and the motion are within the plane of the coil. Here the force exerted by the wire on the coil is in the direction _____.



    a. away from the wire

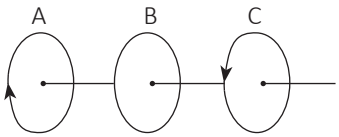
    b. towards the wire

    c. into the paper plane

    d. out of the paper plane

SECTION - C : BRAINBOX

21. Rohan placed three closed similar coils A, B and C as shown in the figure. If coil B and C are static while coil A is moving with a uniform speed toward coil B, what would happen?



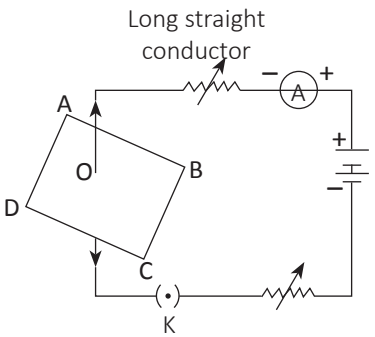
a. No current will flow in coil B.

b. Clockwise current will be induced in coil B, as seen by eye.

c. Anti-Clockwise current will be induced in coil B, as seen by eye.

d. Current induced in coil will be equal to A and C, but in opposite direction, hence net current in coil B will be zero.

22. If the key in the arrangement is taken out (the circuit is made open) and magnetic field lines are drawn over the horizontal plane ABCD, the lines are:



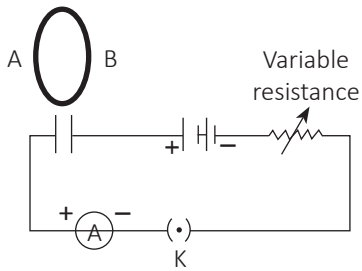
a. concentric circles.

b. elliptical in shape.

c. straight lines parallel to each other.

d. concentric circles near the point O but of elliptical shapes as we go away from it.

23. A circular loop placed in a plane perpendicular to the plane of paper carries a current when the key is ON. The current as seen from points A and B (in the plane of paper and on the axis of the coil) is anti clockwise and clockwise respectively. The magnetic field lines point from B to A. The N-pole of the resultant magnet is on the face close to



a. A

b. B

c. A if the current is small, and B if the current is large.

d. B if the current is small, and A if the current is large.

24. Match column 1 with column 2 and mark the correct option for it.

Column -1	Column-2
A. A charge at rest	1. Produces electromagnetic waves
B. A current flowing in a conductor	2. Produces magnetic field
C. A charge moving with a constant velocity	3. Produces electric field
D. A charge moving with an accelerated motion	4. Produces both electric and magnetic fields

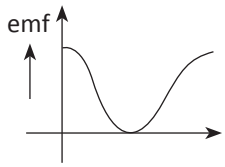
a. A – 3, B – 4, C – 1, D – 2

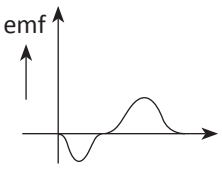
b. A – 3, B – 1, C – 4, D – 2

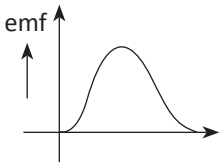
c. A – 2, B – 3, C – 1, D – 4

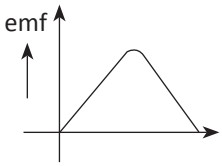
d. A – 2, B – 1, C – 3, D – 4

25. A bar magnet is moved in a coil along it axis with a constant velocity. The variation of inducted e.m.f with time is represented in graphs. Which graph best represents the variation?

a. 

b. 

c. 

d. 

Darken your choice with HB pencil

1.	a	b	c	d	8.	a	b	c	d	15.	a	b	c	d	22.	a	b	c	d
2.	a	b	c	d	9.	a	b	c	d	16.	a	b	c	d	23.	a	b	c	d
3.	a	b	c	d	10.	a	b	c	d	17.	a	b	c	d	24.	a	b	c	d
4.	a	b	c	d	11.	a	b	c	d	18.	a	b	c	d	25.	a	b	c	d
5.	a	b	c	d	12.	a	b	c	d	19.	a	b	c	d					
6.	a	b	c	d	13.	a	b	c	d	20.	a	b	c	d					
7.	a	b	c	d	14.	a	b	c	d	21.	a	b	c	d					

Chapter
12

Source of Energy

- We get useful energy from specific sources, which we call the sources of energy. For example, take a brick and a piece of uranium. The brick has internal energy due to the motion of its molecules, and uranium has energy locked in the nuclei of its atoms.
  - Renewable sources of energy are those which can be generated by us or which are constantly being generated by natural processes or whose supply is unlimited.
  - Non-renewable sources of energy are those which were produced in the past by natural processes, whose supply is limited and which we cannot generate ourselves.
  - Solar radiation which passes through the glass heats up the surfaces inside the greenhouse. These warm surfaces radiate heat. Since these surfaces are at a much lower temperature than the sun, this radiation consists mainly of long-wavelength IR. These are reflected by the glass wall and roofs, thus trapping heat inside the greenhouse. The trapped heat keeps the greenhouse warm, even at night.
  - Wind-mill is a machine that works with the energy of blowing air of wind. Two types of wind-mills have been used in the past. One to run the water-pumps to draw water from the ground and the other for grinding grains to produce flour.

SECTION - A : SCIENTIFIC REASONING

1. The site of a hydroelectric plant should be chosen carefully because it:
   a. affects the organisms of the region.
   b. produces a large amount of carbon monoxide and carbon dioxide.
   c. produces a large amount of electricity.
   d. is expensive.

2. The purpose of the glass cover on top of a box-type solar cooker is to:
   a. allow one to see the food being cooked.
   b. allow more sunlight into the box.
   c. prevent dust from entering the box.
   d. reduce heat loss by radiation.

3. The condition for producing biogas is:
   a. air but not water.
   b. water but not air.
   c. air and water.
   d. neither air nor water.

4. The temperature difference between the upper layers and the deeper layers of the ocean should be _____ to install an OTEC power plant.
   a. 40°C b. 50°C
   c. 20°C d. 30°C

5. Nuclear fusion reactions happen spontaneously in _____.
   a. the core of the earth.
   b. the commercial nuclear reactor.
   c. the atmosphere of the sun.
   d. the eruption of a volcano.

6. Which of the following mineral is formed by the decomposition of surface rocks, and leaves a residual mass of weathered material?
   a. Gold b. Bauxite
   c. Zinc d. Coal

7. The energy of a neutron released during a fission process should be reduced by about_____ part to convert it into a thermal neutron.
   a. 10^2 b. 10^5
   c. 10^8 d. 10^{-5}

8. For obtaining solar energy during sunlight, energy is stored in the batteries of:
   a. Nickel cadmium b. Zinc cadmium
   c. Nickel zinc d. Hydrogen

9. The cause behind acid rain is:
   a. electrical charge are produced due to friction amongst the clouds
   b. the sun leads to the heating of the upper layer of the atmosphere.
   c. due to release of burning of the fossil fuels oxides of carbon, nitrogen and sulphur into the atmosphere.
   d. none of these

10. In the northern hemisphere, the prevailing wind direction in the latitudes between 0° and 30° is expected to be:
   a. North b. North-East
   c. South d. West

11. Which of the following contributes to the improvement of efficiency of Rankine cycle in a thermal power plant?
   a. Reheating of steam at the intermediate stage.
   b. Regeneration use of steam for heating boiler feed water.
   c. Use of high pressures.
   d. All of the above.

12. Which of the following statement is incorrect for wind power?
    a. It is expected to harness wind power to minimum in open space
    b. The potential energy content of wind blowing at high altitudes is the source of wind power
    c. Wind hitting at the blades of a windmill causes them to rotate which can be utilized further for many purposes
    d. None of these

13. Electricity from the ocean can be generated based on utilizing
    a. Kinetic energy of the waves but not stored thermal energy
    b. Stored thermal energy but not kinetic energy of the waves
    c. Kinetic energy of the waves as well as stored thermal energy
    d. Neither kinetic energy of the waves nor stored thermal energy

14. The major problem in harnessing nuclear energy is how to
    a. split nuclei.
    b. sustain the reaction.
    c. dispose off the spent fuel safely.
    d. convert nuclear energy into electrical energy.

15. Energy released in the fission of 1 kg of U-23S is equivalent to energy obtained from burning of coal of weight.–
    a. 25 ton
    b. 250 ton
    c. 2500 ton
    d. 25000 ton

SECTION - B : EVERYDAY SCIENCE

16. Which of the following forms of energy leads to least environmental pollutions in the process of its harnessing and utilization?
    a. Thermal energy
    b. Nuclear energy
    c. Solar energy
    d. Geothermal energy

17. In a hydroelectric power plant more electrical power can be generated if water falls from a greater height because
    a. its temperature increases.
    b. larger amount of potential energy is converted into kinetic energy.
    c. the conductivity water increases with height.
    d. more water molecules dissociate into ions.

18. The mean wind speed at site A for a wind farm is 10% higher than at site B. The expected increase in electricity production at site A compared to site B is
    a. 10%
    b. 20%
    c. 30%
    d. 33%

19. What has raised uncertainties about the security of energy supply in the future?
    a. Rising prices of oil and gas
    b. Lack of water resources
    c. Limited use of non-renewable fossil fuels
    d. Increasing use of renewable energy resources

20. Read the following statements and mark the incorrect option.
    a. We are encouraged to plant more trees so as to ensure clean environment and also provide bio-mass fuel
    b. Gober-gas is produced when crops, vegetable wastes etc. decompose in the absence of oxygen
    c. The main ingredient of bio-gas is ethane and it gives a lot of smoke and also produces a lot of residual ash
    d. Bio-mass is a renewable source of energy

SECTION - C : BRAINBOX

21. What are the main disadvantages of geothermal energy?

a. It is less efficient in regard to power production.

b. Difficult to transport.

c. Non-availabilty at every place.

d. All of these

22. Choose the correct statement.

a. Producer gas is a mixture of flammable gas only.

b. Lubricating oil has boiling range less than 3000°C.

c. Biogas is a combustible gas obtained by the anaerobic decompose of plant material or waste.

d. U-234 is used as moderator in a nuclear reactor.

23. Aditi compared two fuels A & B and tabulated their characteristics given below –

Characteristics	Fuel A	Fuel B
Calorific value	50 kJ/g	80 kJ/g
Gases produced on burning	CO, SO_2	CO_2
Ignition temperature	20°C	80°C

Based on this information, which fuel is an ideal fuel and why?

a. Fuel A, because it has lower ignition temperature and lower calorific value.

b. Fuel B, because it has higher ignition temperature and lower calorific value.

c. Fuel B, because it has higher calorific value and is producing only CO_2.

d. Fuel A, because it has lower ignition temperature and is producing CO & SO_2.

24. Study the given table. Which one is incorrectly matched?

	Column A	Column B
a	Nuclear fusion	Solar energy
b	Nuclear Fission	Reactor in nucleary power plant
c	Nuclear Fuel	Liquid chlorine
d	Rocket Fuel	Liquid oxygen

25. When can a chain reaction stop in a nuclear reactor?

a. If the control rods are fully inserted into the graphite.

b. If a nuclear reactor has half the length of all its control rods inserted in graphite.

c. If the reactor core suddenly gets too hot.

d. If the reactor core suddenly gets too cool.

Darken your choice with HB pencil

1.	a	b	c	d	8.	a	b	c	d	15.	a	b	c	d	22.	a	b	c	d						
2.	a	b	c	d	9.	a	b	c	d	16.	a	b	c	d	23.	a	b	c	d						
3.	a	b	c	d	10.	a	b	c	d	17.	a	b	c	d	24.	a	b	c	d						
4.	a	b	c	d	11.	a	b	c	d	18.	a	b	c	d	25.	a	b	c	d						
5.	a	b	c	d	12.	a	b	c	d	19.	a	b	c	d											
6.	a	b	c	d	13.	a	b	c	d	20.	a	b	c	d											
7.	a	b	c	d	14.	a	b	c	d	21.	a	b	c	d											

Chapter
13

Sustainable Management of Natural Resources

- The ecosystems are classified broadly into two main types. Natural ecosystem and artificial ecosystem. A forest is an example of a natural ecosystem. A crop field and an aquarium are examples of artificial ecosystem.
  - It shows the feeding relationship between living organisms, i.e, who eats whom. A food chain starts with producers. An example of food chain is -

    Plant $\xrightarrow{\text{eaten by}}$ Deer $\xrightarrow{\text{eaten by}}$ Lion

    Each step in the food chain is called trophic level. In the given example, plant, deer and lion form the three trophic levels.
  - Decrease in the thickness or amount of ozone gas in the atmosphere is called ozone depletion.
  - Proper disposal of wastes is called garbage management. Wastes generated by human beings are of two main types: Biodegradable and Non-biodegradable.
  - Different types of wastes should be dumped into different dustbins. The biodegradable wastes can be decomposed by the microorganisms and the non-biodegradable wastes can be recycled again.

SECTION - A : SCIENTIFIC REASONING

1. Chemicals and pesticide residues are transferred in food chain from one level to another. The amount of these chemicals in human beings is
   a. minimum in concentration.
   b. maximum in concentration.
   c. same as present in first level.
   d. same as present in second level.

2. In a food chain containing 'Plants, Sheep and Man', 5 J of energy is available to man. The energy that was available at producer level is
   a. 50 J b. 500 J
   c. 5 J d. 0.5 J

3. Solar cooker is considered to be an eco-friendly device because
   I. it does not cause pollution.
   II. it uses non-renewable source of energy.
   III. it uses renewable source of energy.
   IV. it does not require energy.
   a. I and II b. I and III
   c. Only IV d. Only II

4. X is the process of accumulation of pesticides in the human body. X can have an adverse effect on balance in nature. Here X can be
   a. Biomagnification b. Bioaccumulation
   c. Bio concentration d. Biodegradation

5. The harmful effects of eutrophication are
   I. Algae consume all the oxygen of the water body which affects the aquatic life adversely
   II. It causes water pollution
   a. Only I
   b. Only II
   c. Both I and II
   d. None of the above

6. "Damage to the ozone layer is a cause for concern". Which of the following shows correct option to limit this damage?
   I. Minimizing the use of chemicals called chlorofluorocarbons
   II. Finding an alternate to chlorofluorocarbons
   III. Use of ecofriendly households cleaning projects
   a. Only I b. Only II
   c. I, II and III d. I and II

7. It is necessary to conserve our environment because
   I. We are the part of our environment and fulfill our needs through the environment
   II. Any kind of harm in the environment will finally affect us hence we need to conserve our environment
   III. A healthy environment can keep living beings healthy
   a. Only I b. Only II
   c. I, II and III d. I and II

8. Which of the following correctly describes the differences between hydrarch succession and xerarch succession?
   I. Hydrarch succession takes place in wet areas, but xerarch succession takes place in dry areas.
   II. In hydrarch succession, the series progress from xeric to mesic conditions but in xerarch succession the successional series progress from hydric to the mesic condition.

a. Only I
b. Only II
c. Both I and II
d. None of the above

9. When DDT was used in a lake in USA, to control mosquitoes, it was found that it had entered the food chain and maximum amount of DDT was found in
   a. First trophic level
   b. Second trophic level
   c. Third trophic level
   d. Fourth trophic level

10. The food chain shown below represents certain feeding relationships in a lake.

    Algae ⟶ Mosquito larva ⟶ Gourami ⟶ Arowana

    A chemical pesticide is sprayed onto the water to control the growth of mosquito larvae. In which organism would one find the largest concentration of insecticide per unit dry mass?
    a. Algae
    b. Arowana
    c. Gourami
    d. Mosquito Larvae

11. Which among the following are natural ecosystems?
    i. Estuaries ii. Mountain
    iii. Crop field iv. Park
    v. Coral reefs vii. Aquarium
    viii. Mangrooves
    a. iii., vi. and viii.
    b. i., ii. and iv.
    c. v. and vii.
    d. Both b. and c.

12. Food webs are prominent in an eco-system because one consumer is
    a. not dependent on a specific kind of food.
    b. dependent on a specific kind of food.
    c. not dependent on different kinds of food.
    d. not dependent on food.

13. In India, vast tracts of forests are cleared and a single species of plant is cultivated. This practice promotes -
    a. Biodiversity in the area
    b. Monoculture in the area
    c. Growth of natural forest
    d. Preserves the natural ecosystem in the area.

14. Due to the high amount of DDT in the body of the crane, population of cranes decline because it disturbs the
    a. blood circulation.
    b. excretion.
    c. hormone secretion.
    d. calcium metabolism.

15. Mammals typically consumes more food than animals like fish because
    a. fish are a lot more efficient at digesting their food sources.
    b. fish have more efficient feeding habit than mammals.
    c. mammals need to generate more heat to maintain their body temperature.
    d. mammals are much more active than fish.

16. Which of the following represents way to strike a balance between environment and development?

    I. Recycling of the non-biodegradable wastes like plastic, glass etc.

    II. Replenishment of the forest resources along with industrialisation

    III. Increasing the number of decomposers in the environment

    a. Only I
    b. Only II
    c. Only III
    d. Both I and II

17. Jeevan is a worker of cotton textile industry. He is susceptible to X disease. Which of the following is correct about X diseases?

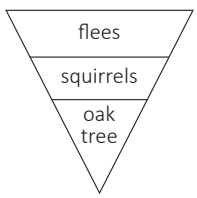
    I. It is not the cotton dust that directly causes that disease.

    II. It is endotoxins that come from the cell walls of gram-negative bacteria that grow on the cotton causing that disease.

    III. Here X represents byssinosis, or "brown lung disease".

    a. Only I
    b. Only II
    c. I, II and III
    d. I and II

18. Refer to the pyramid shown below. Which of the following best explains why the pyramid is inverted?



    a. The oak tree is of the lowest biomass compared to the squirrels and fleas.
    b. Each trophic level has organisms of a smaller size than the one below.
    c. There is an over population of higher consumers, resulting in a drastic decline in the lower trophic level.
    d. The fleas and squirrels die out at a much faster rate than the oak tree.

19. Choose the correct statement

    a. Sustainable development is a long, planned and persistent development.
    b. Sustainable development encourages development for current generation and conversation of resources for future generation.
    c. Economic development is linked to environmental conversation.
    d. All of these

20. Radhika tabulated some information about a few food chains as given here. Which of the following food chain is correct?

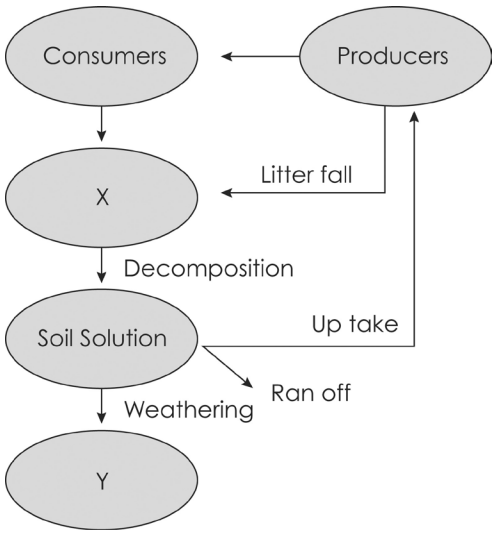
Trophic Level	No. of organisms	Energy in trophic level
A	1000	100000
B	10	1000
C	10000	1000000
D	100	10000

    a. A → B → C → D
    b. A → D → C → B
    c. C → A → D → B
    d. C → B → D → A

SECTION - C : BRAINBOX

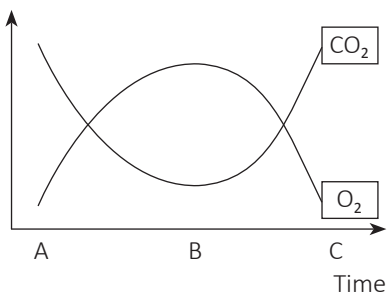
21. The given diagram shows the phosphorous cycling in a terrestrial ecosystem.

    Identify correct option for X and Y.



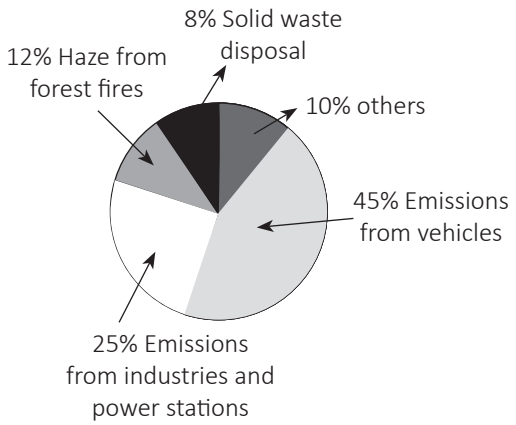
    a. X- Detritus Y- rock minerals
    b. X- Rock minerals Y- humus
    c. X- Sand Y- Rock particles
    d. None of the above

22. Study the given graph. It shows the changes in O_2 and CO_2 gas levels in a botanical garden over a 12-hour period. What do you conlude from the overall shape of the two curves in this graph?



    a. The amount of CO_2 is the air, before sunrise, is at its maximum as plants do not photosynthesis at night.
    b. The amount of O_2 in the air, before sunrise, is at its maximum as plants breathe in O_2.
    c. The rate of photosynthesis is at its maximum at noon.
    d. All of these are correct.

23. The pie chart below shows the sources of air pollution in a particular country.

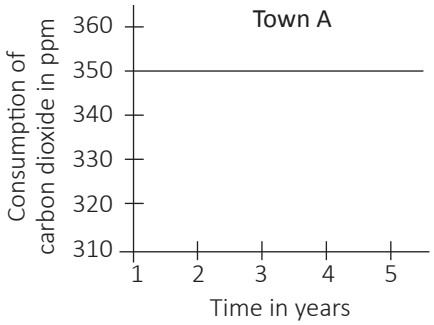


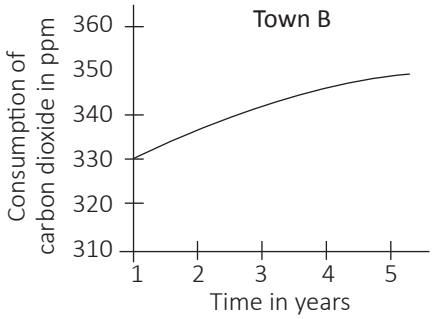
    Based on the pie chart, what action will reduce the most amount of air pollution in this country?

    A. Cut down more trees.
    B. Allocate more land for dumping rubbish.
    C. Use energy saving appliances.
    D. Use public transport more often.

    a. A and B only
    b. B and C only
    c. C and D only
    d. A, B and D only

24. Study the two given graphs. They show the variation of concentration of carbon dioxide in the air in two small towns. A and B, over a period of five years.





From the information contained in the graphs, it is possible that

A. town A has maintained its greenery.

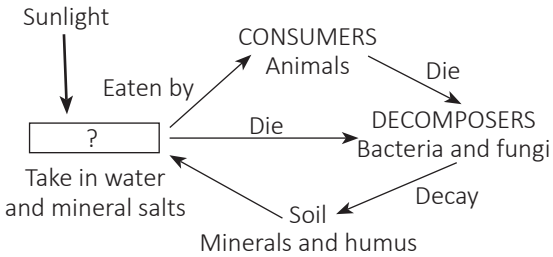
B. town B has cut down a considerable number of trees over the five-year period.

C. the air in Town B has become as polluted as the air in Town A by the fifth year.

D. industrial activity in Town B has significantly increased over the five years.

a. A only
b. D only
c. B and C only
d. A, B, C and D

25. Study the diagram below and fill in the correct choice in the box.



a. Seeds and fruit
b. Flowers and fruit
c. Photosynthesis
d. Producers

Darken your choice with HB pencil

1.	a b c d	8.	a b c d	15.	a b c d	22.	a b c d
2.	a b c d	9.	a b c d	16.	a b c d	23.	a b c d
3.	a b c d	10.	a b c d	17.	a b c d	24.	a b c d
4.	a b c d	11.	a b c d	18.	a b c d	25.	a b c d
5.	a b c d	12.	a b c d	19.	a b c d		
6.	a b c d	13.	a b c d	20.	a b c d		
7.	a b c d	14.	a b c d	21.	a b c d		

Chapter
14

Logical Reasoning

Directions for (Question 1 to 2).
Read the given information to answer questions 1 and 2.

I. A, B, C, D, E, F, G and H are 8 friends sitting around a circle facing towards the center.
II. H is just on the left of A but is not the neighbour of E or D.
III. F is just on the right of B, and G is the neighbour of E.
IV. C is sitting in between E and F.

1. Which of the given statement is correct?

   a. E is in between F and B.
   b. F is the neighbour of G
   c. G is in between H and E
   d. H is in between A and D

2. What is the position of 'D'?

   a. Just on the left of B.
   b. Second to the right of F.
   c. Between B and F.
   d. Just on the left of A.

3. How many numbers are there which are divided by an even number and followed by the number which is divided by an odd number in this series?

   5, 6, 7, 2, 5 9, 2, 4, 9, 3, 6, 4, 3, 9, 2, 4, 0, 2, 1, 5, 8, 2

   a. 1 b. 2
   c. 4 d. 5

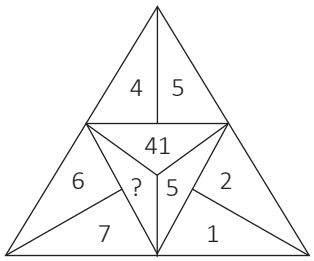
4. Which letter is 16th to the right of the letter which is 4th to the left of 'I'?

   a. R b. S
   c. T d. U

5. Which letter should be the 9th letter to the left of the 9th letter from the right, if the first half of the given alphabet is reversed?

   a. D b. E
   c. F d. I

6. Study the given figure and find the number to replace the "?" mark.



   a. 16 b. 85
   c. 112 d. 125

7. Identify the rule and find the missing number in place of '?' mark in the given grid.

41	43	4
47	53	36
?	61	4

   a. 59 b. 60
   c. 63 d. 67

8. In a certain code '123' means 'Speed and Accident', '345' means 'Speed is Cause' and '146' means 'Accident is Effect'.

   Which one of the following numerical symbol stands for cause?

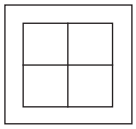
   a. 3 b. 4
   c. 5 d. 6

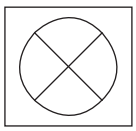
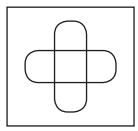
9. In a certain code, VACATE is written as AVACET, How is LITERATE written in that code?

a. ILETARET B. ILTERATE

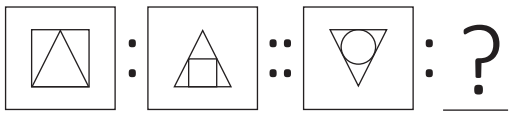
C. ILTREATE D. ILRTEATE

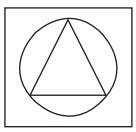
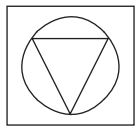
10. Study the givdn figures and choose the odd one out.

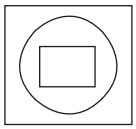
a.  b. 

c.  d. 

11. Find the correct figure which reprocess "?".



a.  b. 

c.  d. 

12. Pointing out to a photograph, a man tells his friend, "She is the daughter of the only son of my father's wife." How is the girl related to the man in the photograph?

a. Daughter b. Mother

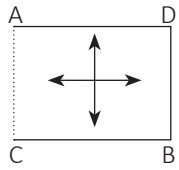
c. Sister d. Cousin

13. A man told to a lady, "The son of your only brother is the brother of my wife". What is the lady to the man?

a. Mother b. Wife

c. Sister d. Sister of father-in-law

14. Study the given diagram. 'A' starts crossing the field diagonally. After walking half the distance, he turns right, walks some distance and turns to left. Which direction 'A' is facing now?



a. East b. West

c. North d. South

15. A cat runs 20 m towards East and turns to right, then runs 10 m and turns to right, again runs 9 m and turns to left, now runs 5 m and turns to left, then runs 6 m. Now which direction is the car facing?

a. East b. West c. North d. South

16. 48 is to 122 as 168 is to ?

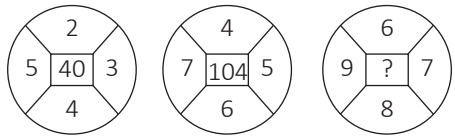
a. 284 b. 286 c. 288 d. 290

17. What comes in place of '?' in the given series?

8, 4, 12, 6, 18, ?, 27

a. 10 b. 27 c. 18 d. 24

18. Find the number which replaces the question mark.



a. 190 b. 200 c. 210 d. 204

Study the given sequence and answer questions 19 and 20.

E F G B D M G N K H 2 A C Z S V 3 F I J L O Q 5 P R

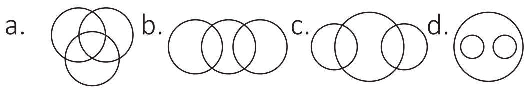
19. If every 3rd letter/number starting from the right replaces successive days of the week starting from Monday, then which letter will replace Thursday?

a. A b. F c. S d. Z

20. If every alternate letter/number is dropped starting from E onwards, then which number/letter will be the second to the left of the 10th letter/number from the left?

a. A　b. B　c. Q　d. V

21. Which of the following Venn diagrams represents the relationship between Copper, Mercury and Metals?



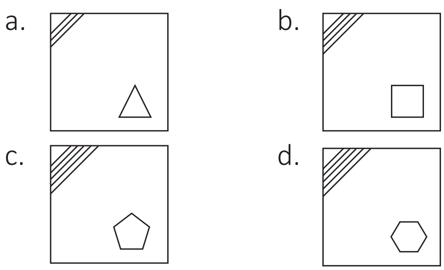
22. In a school contest, four school houses participated. Green got points twice as many as Blue, who were 25 points below Red. Red got 32 points more than Yellow who came last with 54 points. Which house is the winner of the context?

a. Yellow　b. red
c. Blue　d. Green

23. Aman and Aditi start walking in opposite directions. Aman walked 5 km and Aditi walked 6 km. Then, both of them turned to their right and walked 2 km. They turned to right and walked 3 km, again turned to right and walked 2 km. How much distance apart are they from each other.

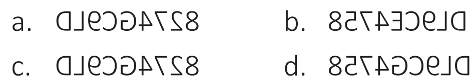
a. 3 km　b. 5 km
c. 7 km　d. 9 km

24. Study the given figures and choose odd one out.

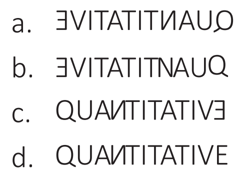


Find the mirror images of the words/numbers/figures given below for Q.No. 25 and 26.

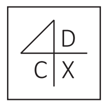
25. DL9CG4728

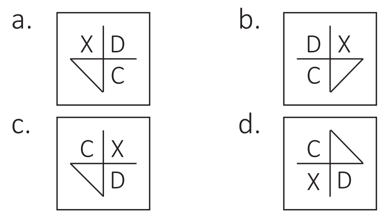


26. QUANTITATIVE

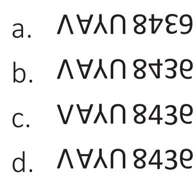


Find the water image of the given number/letters/figures for Q. No. 27 and 28.

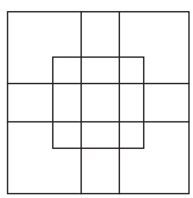
27. 



28. VAYU8436

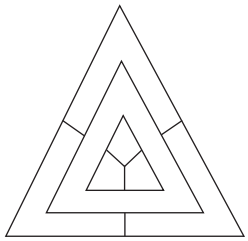


29. Find the number of squares in the given figure.



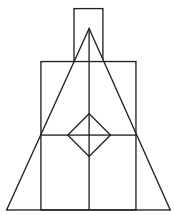
a. 20　b. 25
c. 27　d. 30

30. What is the minimum number of columns required to fill the spaces in the given diagram? Any two adjacent spaces should not have same colour.



a. 3 b. 4
c. 5 d. 6

31 Find the number of triangles and squares in the given figure.



a. 18 triangles, 8 squares
b. 20 triangles, 8 squares
c. 21 triangles, 7 squares
d. 22 triangles, 7 squares

Read the information to answer Q. 32 & 33. A cube of each side 8 cm, has been printed blue, yellow and green on pairs of opposite faces. It is then cut into small cubes of each side 2 cm.

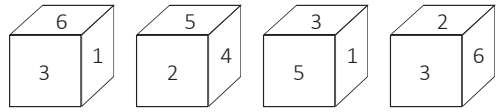
32. How many small cubes will be there?

a. 20 b. 64
c. 80 d. 8

33. How many small cubes will have there faces printed?

a. 20 b. 22
c. 24 d. 28

34. A dice has been thrown four times that produces result as shown here.



Which number will appear opposite to number 3?

a. 1 b 4
c. 5 d. 6

35. Five friends A, B, C, D and E are sitting in a row with their backs towards North. C is immediate right to E and D is immediate left to A.

Only B is in between A and E. Which of the following are at extreme ends?

a. B, A b. D, E
c. B, E d. C, D

36. Read the given statements.

I. Tanmay is older than Tanya.

II. Tarun is older than Tanmay.

III. Tanya is older than Tanmay.

If the first two statements are correct, what about third statement?

a. Correct
b. Incorrect
c. Partially correct
d. Uncertain

37. The total age of Ram, Shyam and Reena is 80 years. What was the total of their ages 3 years ago?

a. 71 years
b. 72 years
c. 74 years
d. 76 years

38. Choose the odd one out.

a. Dodge
b. Flee
c. Duck
d. Avoid

39. Ten new T.V programmes appeared during month of April. Five of the shows were comedy shows, 3 were hour-long dramas and 2 were news-magazine shows. By August, only 7 of those new shows were still on the air. 5 of the shows that remained were comedy.

Read the above given paragraph and find the statement that must be correct according to the given information.

a. Only- one of the news-magazine shows remained on the air.
b. Only one of the hour-long dramas remained on the air
c. At least one of the shows that was cancelled was an hour-long drama
d. T.V reviewers prefer comedy shows over hour-long drama

40. Read the given sentence, the word written in CAPITALS has 3 letters missing. The missing letters are next to each other and, when written in the same order, they make a word on their own. Choose the missing 3 letter words from the given option "Mom and Dad have gone SPING in the local supermarket".

a. HOP
b. SET
c. EVE
d. WIN

Darken your choice with HB pencil

1. (a) (b) (c) (d)	11. (a) (b) (c) (d)	21. (a) (b) (c) (d)	31. (a) (b) (c) (d)
2. (a) (b) (c) (d)	12. (a) (b) (c) (d)	22. (a) (b) (c) (d)	32. (a) (b) (c) (d)
3. (a) (b) (c) (d)	13. (a) (b) (c) (d)	23. (a) (b) (c) (d)	33. (a) (b) (c) (d)
4. (a) (b) (c) (d)	14. (a) (b) (c) (d)	24. (a) (b) (c) (d)	34. (a) (b) (c) (d)
5. (a) (b) (c) (d)	15. (a) (b) (c) (d)	25. (a) (b) (c) (d)	35. (a) (b) (c) (d)
6. (a) (b) (c) (d)	16. (a) (b) (c) (d)	26. (a) (b) (c) (d)	36. (a) (b) (c) (d)
7. (a) (b) (c) (d)	17. (a) (b) (c) (d)	27. (a) (b) (c) (d)	37. (a) (b) (c) (d)
8. (a) (b) (c) (d)	18. (a) (b) (c) (d)	28. (a) (b) (c) (d)	38. (a) (b) (c) (d)
9. (a) (b) (c) (d)	19. (a) (b) (c) (d)	29. (a) (b) (c) (d)	39. (a) (b) (c) (d)
10. (a) (b) (c) (d)	20. (a) (b) (c) (d)	30. (a) (b) (c) (d)	40. (a) (b) (c) (d)

Answers

Chapter 1: Chemical Reactions and Equations

1.	c	2.	a	3.	b	4.	d	5.	b	6.	c	7.	d	8.	a	9.	b	10.	c
11.	d	12.	d	13.	a	14.	c	15.	c	16.	d	17.	b	18.	c	19.	c	20.	c
21.	d	22.	b	23.	b	24.	a	25.	c										

Chapter 2: Acids, Bases and Salts

1.	c	2.	a	3.	d	4.	a	5.	b	6.	b	7.	c	8.	c	9.	d	10.	a
11.	b	12.	d	13.	a	14.	b	15.	b	16.	a	17.	c	18.	a	19.	a	20.	a
21.	d	22.	b	23.	b	24.	d	25.	d										

Chapter 3: Metals and Non-Metals

1.	a	2.	b	3.	c	4.	d	5.	b	6.	b	7.	c	8.	b	9.	b	10.	c
11.	c	12.	a	13.	a	14.	a	15.	b	16.	a	17.	b	18.	b	19.	b	20.	c
21.	b	22.	b	23.	d	24.	c	25.	b										

Chapter 4: Carbon and Its Compounds

1.	a	2.	b	3.	a	4.	a	5.	b	6.	b	7.	c	8.	a	9.	a	10.	b
11.	d	12.	a	13.	a	14.	d	15.	c	16.	a	17.	d	18.	b	19.	c	20.	b
21.	a	22.	d	23.	a	24.	d	25.	c										

Chapter 5: Periodic Classification of Elements

1.	b	2.	b	3.	c	4.	a	5.	c	6.	b	7.	c	8.	c	9.	d	10.	a
11.	d	12.	c	13.	c	14.	a	15.	c	16.	b	17.	c	18.	b	19.	d	20.	a
21.	d	22.	a	23.	c	24.	b	25.	c										

Chapter 6: Life Processes

1.	a	2.	d	3.	b	4.	b	5.	c	6.	c	7.	d	8.	b	9.	b	10.	d
11.	c	12.	a	13.	a	14	c	15.	b	16.	c	17.	c	18.	b	19.	d	20.	a
21.	d	22.	b	23.	a	24.	a	25.	c										

Chapter 7: Reproduction in Plants and Animals

1.	c	2.	c	3.	a	4.	d	5.	d	6.	b	7.	b	8.	b	9.	a	10.	c
11.	c	12.	b	13.	d	14.	d	15.	b	16.	c	17.	d	18.	d	19.	c	20.	b
21.	b	22.	c	23.	c	24.	c	25.	d										

Chapter 8: Heredity and Evolution

1.	d	2.	b	3.	a	4.	c	5.	a	6.	c	7.	d	8.	b	9.	c	10.	b
11.	a	12.	d	13.	d	14.	d	15.	a	16.	a	17.	a	18.	d	19.	b	20.	b
21.	c	22.	b	23.	d	24.	b	25.	b										

Chapter 9: Light - Reflection, Refraction and Human Eye

1.	b	2.	c	3.	d	4.	b	5.	c	6.	d	7.	b	8.	c	9.	a	10.	d
11.	b	12.	b	13.	c	14.	d	15.	c	16.	b	17.	a	18.	b	19.	a	20.	c
21.	a	22.	b	23.	d	24.	c	25.	d										

Chapter 10: Electricity

1.	b	2.	d	3.	c	4.	a	5.	c	6.	d	7.	a	8.	a	9.	a	10.	c
11.	b	12.	c	13.	c	14.	c	15.	b	16.	b	17.	d	18.	d	19.	c	20.	a
21.	a	22.	b	23.	b	24.	c	25.	b										

Chapter 11: Magnetic Effects of Electric Current

1.	c	2.	a	3.	b	4.	a	5.	d	6.	d	7.	a	8.	b	9.	a	10.	b
11.	d	12.	a	13.	c	14.	b	15.	d	16.	d	17.	d	18.	a	19.	d	20.	a
21.	c	22.	c	23.	a	24.	a	25.	b										

Chapter 12: Source of Energy

1.	a	2.	d	3.	b	4.	c	5.	c	6.	c	7.	c	8.	c	9.	c	10.	d
11.	d	12.	b	13.	c	14.	a	15.	c	16.	c	17.	b	18.	d	19.	a	20.	c
21.	d	22.	c	23.	c	24.	c	25.	a										

Chapter 13: Sustainable Management of Natural Resources

1.	b	2.	b	3.	b	4.	a	5.	c	6.	c	7.	c	8.	c	9.	d	10.	b
11.	b	12.	c	13.	c	14.	d	15.	c	16.	d	17.	c	18.	b	19.	d	20.	c
21.	a	22.	d	23.	c	24.	d	25.	d										

Chapter 14: Logical Reasoning

1.	c	2.	a	3.	d	4.	d	5.	b	6.	b	7.	a	8.	c	9.	a	10.	c
11.	b	12.	a	13.	d	14.	a	15.	a	16.	d	17.	b	18.	b	19.	c	20.	d
21.	d	22.	d	23.	b	24.	d	25.	b	26.	a	27.	c	28.	b	29.	c	30.	a
31.	c	32.	b	33.	c	34.	b	35.	d	36.	b	37.	a	38.	b	39.	c	40.	a

My Notes