केंद्रीय विद्यालय संगठन क्षेत्रीय कार्यालय एर्नाकुलम

Kendriya Vidyalaya Sangathan Regional Office Ernakulam

CLASS-X

Study Material

Term-1

SCIENCE -086

Based on Latest CBSE Exam Pattern
for the Session 2021-22

आर सेन्दिल कुमार
उपायुक्त

R. Senthil Kumar
Deputy Commissioner

तत् त्वं पूषन् अपावृणु
केन्द्रीय विद्यालय संगठन

केन्द्रीय विद्यालय संगठन,
क्षेत्रीय कार्यालय, एरणाकुलम

KENDRIYA VIDYALAYA SANGATHAN
REGIONAL OFFICE,
ERNAKULAM,
KOCHI – 682 020
Ph. No.0484- 2205111(DC), 2203091(Fax))
Website: www.roernakulam.kvs.gov.in
Email : dcernakulamregion@gmail.com

F.31/Acad/KVS(EKM) *Dated: 01.11.2021*

Message

I feel immense pleasure to publish the study material for class X Science . This support material is prepared incorporating all the recent changes in curriculum and assessment process made by CBSE. I am sure it will definitely be of great help to class X students of all Kendriya Vidyalayas.

Getting acquainted with the latest changes will help students to prepare well for the board examination and enable students to face case based and Multiple-Choice Questions with confidence. This support material has been prepared by a team of dedicated and veteran teachers with expertise in their respective subjects.

The Support material contains all the important aspects required by the students- the term wise split up syllabus, summary of all the chapters, important formulas, Sample question papers, problem solving and Case study questions.

I hope that this Support Material will be used by students and teachers as well and will prove to be a good tool for quick revision.

I would like to express my sincere gratitude to the In- charge principal and all the teachers who have relentlessly worked for the preparation of this study material. Their enormous contribution in making this project successful is praiseworthy.

Meticulous planning blended with hard work, effective time management and sincerity will help the students to reach the pinnacle of success.

Wish you all the best

(R Senthil Kumar)

Kendriya Vidyalaya Sangathan Regional office
Ernakulam

केंद्रीय विद्यालय संगठन क्षेत्रीय कार्यालय एर्नाकुलम

Our Patron

Shri. R Senthil Kumar
Deputy Commissioner
Ernakulam Region

Smt. Deepti Nair
Asst. Commissioner
KVS RO Ernakulam

Shri. Santhosh Kumar N
Asst. Commissioner
KVS RO Ernakulam

Coordination Committee In-Charge: V Santhosh Kumar, Principal KV Malappuram

CONTENT CREATORS

Sl. No.	Name of the Chapter	Name of the Teacher	Designation	Name of the KV
1	Chapter 1 Chemical reactions and equations	1.Mrs. JAYA.B	PGT Chemistry	1.KV Ottapalam
2	Chapter 2 Acids, Bases and Salts	2.Mrs.Laly Mathew 3.Mrs. Sheeja. P	TGT Science	1.KV No.1 Naval Base,Kochi 2.KV Ottapalam
3	Chapter 3 Metals & Non-Metals	4.Mrs. Radhika.R	TGT Science	1.KV NAD Aluva
4	Chapter 6 Life Processes	5.Mrs. Sheeba Rani KR 6.Mr. Sreejith Gopalan 7.Mrs. Santha.S	TGT Science	1.KV CRPF Pallipuram 2.KV Kollam 3.KV Kanjikode
5	Chapter 10 Light-Reflection& Refraction	1.Mrs. Meera. V 2.Ms.Aswathy.T.B	PGT Physics	1.KV Ottapalam 2.KV Kanjikode
6	Chapter 11 Human eye & colourful world	1. Ms. Raimol Varghese	TGT Science	1.KV NAD Aluva
7.	Sample Paper 1	Mrs. Sheeba Rani KR	TGT Science	KV CRPF Pallipuram
8.	Sample Paper 2	1.Mrs. Subhadra Sankar	TGT Science	KV Malappuram
9.	Sample Paper 3	Ms. Raimol Varghese	TGT Science	KV NAD Aluva

Review Committee

1.Mrs.P.C.Radha (PGT Physics),KV Malappuram
2.Mrs.Bindu K.M(PGT Biology), KV Malappuram
3.Mrs.Bindu T.P(PGT Chemistry), KV Malappuram
4. Mrs. Subhadra Sankar (TGT Science), KV Malappuram

TERM 1 SYLLABUS

COURSE STRUCTURE CLASS X		
EVALUATION SCHEME		
THEORY		
Units	**Term - I**	**Marks**
I	Chemical Substances-Nature and Behaviour: Chapter 1,2 and 3	16
II	World of Living: Chapter 6	10
III	Natural Phenomena: Chapter 10 and 11	14
Units	**Term II**	**Marks**
I	Chemical Substances-Nature and Behaviour: Chapter 4 and 5	10
II	World of Living: Chapter 8 and 9	13
IV	Effects of Current: Chapter 12 and 13	12
V	Natural Resources: Chapter 15	05
Total Theory (Term I+II)		**80**
Internal Assessment: Term I		**10**
Internal Assessment: Term II		**10**
Grand Total		**100**

TERM - I

Theme: Materials

Unit I: Chemical Substances - Nature and Behaviour Chapter -1 Chemical reactions and equations

Chemical reactions: Chemical equation, Balanced chemical equation, implications of a balanced chemical equation, types of chemical reactions: combination, decomposition, displacement, double displacement, precipitation, neutralization, oxidation and reduction.

Chapter – 2 Acids, Bases and Salts

Acids, bases and salts: Their definitions in terms of furnishing of H+ and OH- ions, General properties, examples and uses, concept of pH scale (Definition relating to logarithm not required), importance of pH in everyday life;

preparation and uses of Sodium Hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.

Chapter – 3 Metals and non – metals

Metals and nonmetals: Properties of metals and non-metals; Reactivity series; Formation and properties of ionic compounds.

Theme: The World of the Living Unit II: World of Living

Chapter – 6 Life processes

Life processes: 'Living Being'. Basic concept of nutrition, respiration, transport and excretion in plants and animals.

Theme: How Things Work

Unit III: Natural Phenomena

Chapter – 10 Light – Reflection and Refraction

Reflection of light by curved surfaces; Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification.

Refraction; Laws of refraction, refractive index.

Refraction of light by spherical lens; Image formed by spherical lenses; Lens formula (Derivation not required); Magnification. Power of a lens.

Chapter – 11 Human eye and colourful world

Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life.

CHAPTER 1

CHEMICAL REACTIONS AND EQUATIONS

FOCUS AREA

Physical change - change in colour or state occurs but no new substance is formed.
Example: Water changes to steam on boiling but no new substance is formed

Chemical change - one or more new substances with new physical and chemical properties are formed.

Example: $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$
(Blue) (Green)

A chemical reaction can be determined with the help of any of the following observations:

a) Evolution of a gas
b) Change in temperature
c) Formation of a precipitate
d) Change in colour
e) Change of state

Representation of a chemical reaction in terms of symbols and chemical formulae of the reactants and products is known as a chemical equation.

$Zn(s) + dil.H_2SO_4(aq) \rightarrow ZnSO_4(aq) + H_2(\uparrow)$
(Reactants) (Products)

- For solids, the symbol is "(s)".
- For liquids, it is "(l)".
- For gases, it is "(g)".
- For aqueous solutions, it is "(aq)".
- For gas produced in the reaction, it is represented by "($\uparrow$) ".
  For precipitate formed in the reaction, it is represented by "($\downarrow$) "
  Other factors like temperature, pressure ,catalyst etc are mentioned above the arrow separating reactants and products

Unbalanced Chemical Equation: If the number of atoms of each element in reactants is not equal to the number of atoms of each element present in the product, then the chemical equation is called Unbalanced Chemical Equation.
Example: $Fe + H_2O \rightarrow Fe_3O_4 + H_2$

BALANCED CHEMICAL EQUATION

According to the Law of Conservation of Mass, mass can neither be created nor destroyed in a chemical reaction. To obey this law, the total mass of elements present in reactants must be equal to the total mass of elements present in products.

The chemical equation in which the number of atoms of each element in the reactants side is equal to that of the products side is called a balanced chemical equation.

BALANCING OF CHEMICAL REACTION

Hit and trial method: While balancing a chemical equation, the coefficients (the numbers in front of the compound or molecule) are changed so that the number of atoms of each element remain the same on each side of the chemical equation. Generally, the number of atoms of elements present in reactants and in products are written and the atom which is maximum in number on either side of a chemical equation is balanced first.

TYPES OF CHEMICAL REACTIONS

Chemical reactions can be classified in following types:

(i) Combination Reaction: Reactions in which two or more reactants combine to form one product are called Combination Reactions.(A + B → AB)

eg:

$Mg(s) + O_2(g) \rightarrow 2MgO(s)$

$C(s) + O_2(g) \rightarrow CO_2(g)$

(ii) Decomposition Reaction: Reactions in which one compound decomposes in two or more compounds or elements are known as Decomposition Reaction. A decomposition reaction is just the opposite of combination reaction.

(AB → A + B)

Types of decomposition:

1. **Thermal Decomposition:** The decomposition of a substance on heating is known as Thermal Decomposition.
   Example: $2Pb(NO_3)_2(s) \xrightarrow{heat} 2PbO(s) + 4NO_2(g) + O_2(g)$
   $CaCO_3(s) \xrightarrow{heat} CaO(s) + CO_2(g)$

2. **Electrolytic Decomposition:** Reactions in which compounds decompose into simpler compounds because of passing of electricity, are known as Electrolytic Decomposition. This is also known as Electrolysis.
   Example: When electricity is passed in water, it decomposes into hydrogen and oxygen.
   $2H_2O(l) \longrightarrow 2H_2(g) + O_2(g)$
3. **Photochemical Decomposition :** Reactions in which a compound decomposes because of sunlight are known as Photolysis or Photo chemical Decomposition Reaction.
   Example: When silver chloride is put in sunlight, it decomposes into silver metal and

chlorine gas.

$2AgCl(s)$ (white) Sunlight $2Ag(s)$ (grey) + $Cl_2(g)$

Photographic paper has a coat of silver chloride, which turns into grey when exposed to sunlight. It happens because silver chloride is colourless while silver is a grey metal.

(iii) Displacement Reaction: The chemical reaction in which a more reactive element displaces a less reactive element from a compound is known as a displacement reaction ($A + BC \rightarrow AC + B$)

Displacement reaction takes place only when 'A' is more reactive than B.

Eg:

$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$

$Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$

(iv) Double Displacement Reaction: Reactions in which ions are exchanged between two reactants forming new compounds are called Double Displacement Reactions.($AB + CD \rightarrow AC + BD$)

eg:

When the solution of barium chloride reacts with the solution of sodium sulphate, white precipitate of barium sulphate is formed along with sodium chloride.

$BaCl_2(aq) + Na_2SO_4(aq) \rightarrow BaSO_4(s)$ (Precipitate) + $2NaCl(aq)$

When sodium hydroxide (a base) reacts with hydrochloric acid, sodium chloride and water are formed.

$NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l)$

Note: Double Displacement Reaction, in which precipitate is formed, is also known as precipitation reaction. Neutralisation reactions are also examples of double displacement reaction.

Precipitation Reaction: The reaction in which precipitate is formed by the mixing of the aqueous solution of two salts is called Precipitation Reaction.

Example:

$AgNO_3 + NaCl \longrightarrow AgCl + NaNO_3$

precipitate

Neutralization Reaction: The reaction in which an acid reacts with a base to form salt and water by an exchange of ions is called Neutralization Reaction.

Example:

$NaOH + HCl \longrightarrow NaCl + H_2O$

REDOX REACTIONS

Oxidation: Addition of oxygen or removal of hydrogen from a compound is known as Oxidation.

Elements or compounds in which oxygen or non-metallic element is added or hydrogen or metallic element is removed are called to be Oxidized.

Reduction: Addition of hydrogen or removal of oxygen from a compound is called Reduction.
The compound or element which undergoes reduction is called to be Reduced.
Oxidation and Reduction take place together.
Oxidizing agent:

- The substance which gives oxygen for oxidation is called an Oxidizing agent.
- The substance which removes hydrogen is also called an Oxidizing agent.

Reducing agent:

- The substance which gives hydrogen for reduction is called a Reducing agent.
- The substance which removes oxygen is also called a Reducing agent.

The reaction in which oxidation and reduction both take place simultaneously is called Redox reaction.
When copper oxide is heated with hydrogen, then copper metal and hydrogen are formed.
$CuO + H_2 \rightarrow Cu + H_2O$
(i) In this reaction, CuO is changing into Cu. Oxygen is being removed from copper oxide. Removal of oxygen from a substance is called Reduction, so copper oxide is being reduced to copper.

(ii) In this reaction, H_2 is changing to H_2O. Oxygen is being added to hydrogen. Addition of oxygen to a substance is called Oxidation, so hydrogen is being oxidised to water.

- The substance which gets oxidised is the reducing agent.
- The substance which gets reduced is the oxidizing agent.

(vi) Exothermic and Endothermic Reactions:
Exothermic Reaction: Reaction which produces energy is called Exothermic Reaction.
Most of the decomposition reactions are exothermic.
Example:
Respiration is an exothermic reaction in which energy is released.
$C_6H_{12}O_6 + 6\ O_2 \longrightarrow 6\ CO_2 + 6\ H_2O + \text{Energy}$

When quick lime (CaO) is added to water, it releases energy.
$CaO + H_2O \longrightarrow Ca(OH)_2 + \text{Heat Energy}$
Quick lime Slaked lime

Endothermic Reaction: A chemical reaction in which heat energy is absorbed is called Endothermic Reaction.
Example: Decomposition of calcium carbonate.
$CaCO_3 + \text{Heat energy} \longrightarrow CaO + CO_2$

Effects of Oxidation Reactions in Everyday life: Corrosion and Rancidity.
Corrosion: The process of slow conversion of metals into their undesirable compounds due to their reaction with oxygen, water, acids, gases etc. present in the atmosphere is called Corrosion.
Example: Rusting of iron.
Rusting: Iron when reacts with oxygen and moisture forms red substance which is called Rust.

$$4\,Fe + 3\,O_2 + 2x\,H_2O \longrightarrow 2\,Fe_2O_3 \cdot x\,H_2O$$

Hydrated ferric oxide(rust)

The rusting of iron is a redox reaction.
Corrosion (rusting) weakens the iron and steel objects and structures such as railings, car bodies, bridges and ships etc. and cuts short their life.
Methods to Prevent Rusting

- By painting.
- By greasing and oiling.
- By galvanisation.

Corrosion of Copper: Copper objects lose their lustre and shine after some time because the surface of these objects acquires a green coating of basic copper carbonate, $CuCO_3.Cu(OH)_2$ when exposed to air.

Corrosion of Silver Metal: The surface of silver metal gets tarnished (becomes dull) on exposure to air, due to the formation of a coating of black silver sulphide(Ag_2S) on its surface by the action of H_2S gas present in the air.
Rancidity: The taste and odour of food materials containing fat and oil changes when they are left exposed to air for a long time. This is called Rancidity. It is caused due to the oxidation of fat and oil present in food materials.
Methods to prevent rancidity:

- By adding anti-oxidant.
- Vacuum packing.
- Replacing air by nitrogen.
- Refrigeration of foodstuff.

SECTION A

MULTIPLE CHOICE QUESTIONS

1. $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$
   Identify the substance oxidized in the above equation.
   (a) $MnCl_2$

(b) HCl

(c) H_2O

(d) MnO_2

2. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is:
   (a) 1 : 1

(b) 2:1

(c) 4:1

(d) 1:2

3. $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$
   The above reaction is an example of:
   (a) combination

(b) double displacement

(c) decomposition

(d) displacement

4. When green coloured ferrous sulphate crystals are heated, the colour of the crystal changes because
   (a) it is decomposed to ferric oxide

(b) it loses water of crystallisation
(c) it forms SO_2

(d) it forms SO_3

5. $2HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + 2H_2O$; is an example of
   (i) displacement reaction

(ii) double displacement reaction
(iii) neutralisation reaction

(iv) combination reaction.
(a) (i) and (ii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i) and (iv)

6. What is observed when a solution of potassium iodide is added to silver nitrate solution ?
   (a) No reaction takes place
   (b) White precipitate of silver iodide is formed
   (c) yellow precipitate of Agl is formed
   (d) Agl is soluble in water.

7. Identify ‘x’, ‘y’ and ‘z’ in the following balanced reaction

$$x\mathrm{Pb(NO_3)_2}(s) \xrightarrow{\text{Heat}} y\mathrm{PbO}(s) + z\mathrm{NO_2}(g) + \mathrm{O_2}(g)$$

   (a) 2, 4, 2 (b) 2, 2, 4 (c) 2, 4, 4 (d) 4, 2, 2

8. Oxidation involves
   (i) gain of electron
   (ii) loss of electron
   (iii) addition of oxygen or electronegative element
   (iv) removal of hydrogen or electropositive element
   (a) (i), (ii), (iii)
   (b) (ii), (iii), (iv)
   (c) (i), (iii), (iv)
   (d) (i), (ii), (iv)

9. Which of the following statements about the given reaction are correct ?
   $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(g) + 4H_2(g)$
   (i) Iron metal is getting oxidised
   (ii) Water is getting reduced
   (iii) Water is acting as reducing agent
   (iv) Water is acting as an oxidising agent
   (a) (i), (ii) and (iii)
   (b) (iii) and (iv)
   (c) (i), (ii) and (iv)
   (d) (ii) and (iv)

10. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved ?
   (i) Displacement reaction
   (ii) Precipitation reaction
   (iii) Combination reaction

(iv) Double displacement reaction
(a) (i) only
(b) (ii) only
(c) (iv) only
(d) (ii) and (iv)

11. The brown gas evolved on heating of copper nitrate is
(a) O_2
(b) NO_2
(c) N_2
(d) NO

12. Zinc reacts with silver nitrate to form which compounds?
(a) $Zn(NO_3)_2 + Ag$
(b) $ZnNO_3 + Ag$
(c) $AgNO_3 + Zn(NO_3)_2$
(d) $Ag + Zn(NO_3)_3$

13. Which of the reactions is used in black and white photography?
(a) Combination Reaction
(b) Decomposition Reaction
(c) Displacement reaction
(d) Oxidation reaction

14. Which option shows oxidation?
(a) $Zn \rightarrow Zn^{+2}$
(b) $2H^{+} \rightarrow H_2$
(c) $Zn^{+2} \rightarrow Zn$
(d) $H_2 \rightarrow 2H$

15. Chemically rust is
(a) hydrated ferrous oxide
(b) only ferric oxide
(c) hydrated ferric oxide
(d) none of these

16. A substance X which is a group 2 element is used intensively in the cement industry . This element is present in bones also. On treatment with water, it forms a solution which turns red litmus blue. Element X is
(a) Cu
(b) Ca
(c)Na
(d) Al

17. On immersing an iron nail in $CuSO_4$ solution for few minutes
(a) no reaction takes place
(b) the colour of solution fades away

(c) the surface of iron nails acquire a black coating
(d) the colour of solution changes to green
18. In which of the following, heat energy will be evolved?
(a) Electrolysis of water
(b) Dissolution of NH_4Cl in water
(c) Burning of L.P.G.
(d) Decomposition of AgBr in the presence of sunlight

SECTION B
ASSERTION/REASON TYPE QUESTIONS

In the following Questions, two statements are given- an Assertion(A) and a Reason(R). Choose the correct alternative from the following:
(a) Both the Assertion and the Reason are true and the Reason is the correct explanation of the Assertion.
(b) The Assertion and the Reason are true but the Reason is not the correct explanation of the Assertion.
(c) Assertion is true but the Reason is false.
(d) Assertion is false but the Reason is true.

19. Assertion: AgBr is used in photographic and X-ray film.
Reason: AgBr is photosensitive and changes to Ag and bromine in presence of sunlight and undergoes decomposition reaction.

20. Assertion(A): Magnesium ribbon keeps on burning in atmosphere of nitrogen.
Reason(R): Magnesium reacts with nitrogen to form magnesium nitrides and this reaction is combination reaction.

21. Assertion(A): Zinc reacts with sulphuric acid to form zinc sulphate and hydrogen gas and it is displacement reaction.
Reason(R): Zinc reacts with oxygen to form zinc oxide.

22. Assertion(A): $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$ is redox reaction.
Reason(R): MnO_2 oxidises HCl to Cl_2 and gets reduced to $MnCl_2$.

23. Assertion(A): A lead nitrate on thermal decomposition gives lead oxide, brown coloured nitrogen dioxide and oxygen gas.
Reason(R): Lead nitrate reacts with potassium iodide to form yellow ppt of lead iodide and the reaction is double displacement as well as precipitation reaction

24. Assertion (A) : Decomposition of vegetable matter into compost is an example of exothermic reactions.
Reason (R) : Exothermic reaction are those reactions in which heat is evolved.

25. Assertion (A) : When HCl is added to zinc granules, a chemical reaction occurs.
Reason (R) : Evolution of a gas and change in colour indicate that the chemical reaction is taking place.

26. Assertion (A) : Calcium carbonate when heated gives calcium oxide and water.
Reason (R) : On heating calcium carbonate, decomposition reaction takes place.

27. Assertion (A) : Brown fumes are produced when lead nitrate is heated.
Reason (R) : Nitrogen dioxide gas is produced as a by product due to the decomposition of lead nitrate.

28. Assertion (A) : White silver chloride turns grey in sunlight.
Reason (R) : Decomposition of silver chloride in presence of sunlight takes place to form silver metal and chlorine gas.

29. Assertion (A): Pungent smelling gas is produced when sulphur burns in air.
Reason (R) : Sulphur trioxide is formed on reaction of sulphur with oxygen.

30. Assertion (A) : In a reaction of copper with oxygen, copper serves as a reducing agent.
Reason (R) : The substance which gains oxygen in a chemical reaction acts as a reducing agent.

31. Assertion (A) :Iron articles are painted so as to as to prevent them from rusting
Reason (R): When the surface of iron is coated with paint , its surface does not come in contact with oxygen and moisture and therefore rusting doesnot take place

32. Assertion (A): Chips manufacturers usually flush bags of chips with gas such as nitrogen to prevent chips from getting oxidised
Reason (R) :Nitrogen being an antioxidant prevents the chips from getting oxidised

SECTION C
CASE STUDY BASED QUESTIONS

33. Corrosion is the phenomenon of deterioration of surface of metal in presence of air and moisture. It is a natural process and in the presence of a moist atmosphere, chemically active metals get corroded. This is an oxidation reaction. Rusting is the process where iron corrodes due to exposure to the atmosphere. The main circumstance of corrosion occurs with iron because it is a structural material in construction, bridges, buildings, rail transport, ships, etc. Aluminium is also an important structural metal, but even aluminium undergoes

oxidation reactions. However, aluminium doesn't corrode or oxidize as rapidly as its reactivity suggests. Copper (Cu) corrodes and forms a basic green carbonate.

1. Corrosion is
(a) a redox reaction
(b) a reduction reaction
(c) a displacement reaction
(d) an oxidation reaction

2. The chemical name of the compound formed on corrosion of silver is
(a) AgCl
(b) Ag_2S
(c) AgBr
(d) $AgSO_4$

3. The chemical formula of rust is

(a) Fe_2O_3 (b) Fe_3O_4 (c) $Fe_2O_3 .xH_2O$ (d) $Fe_3O_4 . xH_2O$

4. Which of the following factors play a vital role in corrosion

(a)Solute concentration (b) temperature (c) Both a and b (d) None of these

5. Corrosion of metals involves

(a) Physical change (b) chemical change (c) both a and b (d) None

34. The redox processes conveys no information about the mechanism by which change takes place. Reactions are classified as redox and non redox on the basis of stoichiometry; oxygen-atom, hydrogen-atom, and electron transfer are stoichiometric categories.
Every atom consists of a positive nucleus, surrounded by negative electrons, which determine the bonding characteristics of each element. In forming chemical bonds, atoms donate, acquire, or share electrons. This makes it possible to assign every atom an oxidation number, which specifies the number of its electrons that can be involved in forming bonds with other atoms.

1. A redox reaction is one in which
(a) both substances are reduced
(b) both substances are oxidised
(c) an acid is neutralised by base
(d) one substance is oxidised while the other is reduced simultaneously

2. An oxidising agent is a substance
(a) which oxidises itself and reduces the other
(b) which reduces itself and oxidises the other
(c) Which reduces itself and reduces the other

(d) which oxidises itself and oxidises the other

3. Which of the following regarding Oxidation is incorrect
(a) loss of electrons
(b) increase of oxidation number
(c) decrease of oxidation number
(d) Removal of hydrogen

4. Reduction is
(a) gain of electrons
(b) sharing of electrons
© loss of electrons
(d)addition of oxygen

5. In the reaction, $CuO + H_2 \xrightarrow{Heat} Cu + H_2O$, the reducing agent is
(a) CuO
(b)H_2
(c) Cu
(d)H_2O

****

ANSWERS

MULTIPLE CHOICE QUESTIONS

1.b 2.b 3.d 4.b 5.b 6.c 7.b 8.b 9.c 10. d 11.b 12. a
13. b 14. a 15. c 16.b 17.d 18.c

ASSERTION/REASON QUESTIONS

19.a 20.a 21.b 22.a 23.b 24.a 25.b 26.d 27.a 28.a 29.c 30.a
31. a 32. c

CASE STUDY BASED QUESTIONS

33. 1. a 2. b 3. c 4.c 5. b
34. 1. d 2.b 3. c 4. b 5.b

****

CHAPTER 2

ACIDS, BASES & SALTS

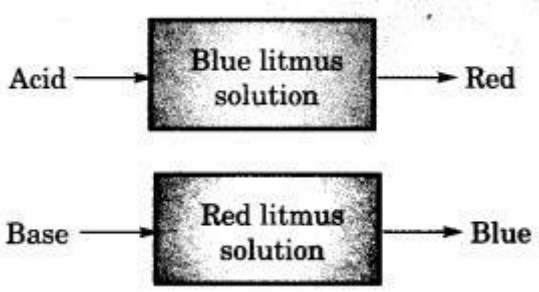
FOCUS AREA

Acids and Bases: Acids are sour in taste and change the colour of blue litmus to red. The term has been derived from the Latin word 'acidus' which means sour taste. Generally, acids have at least one or more hydrogen atoms in their formulae.

An acid may be defined as a chemical substance which releases one or more H^+ or H_3O^+ ions in aqueous solution.
For example, HCl, HNO_3, H_2SO_4, etc.

A base may be defined as a chemical substance which releases one or more OH^- ions in aqueous solution.
For example, NaOH, KOH, etc.

- Acid-Base indicator: Natural/synthetic materials which indicate the presence of acid or base in a solution, are called acid base indicator or simply indicator.
- Litmus solution: It is a purple dye which is extracted from lichen.



- Phenolphthalein: It is a colourless organic dye in acidic or neutral medium, but it changes to pink in basic medium.
- Methyl orange: It is an orange-coloured dye and keeps this colour in the neutral medium. In the acidic medium, the colour of the indicator becomes red and in the basic medium, it changes to yellow.
- Red cabbage juice: Its colour remains red in acidic medium but changes to green if the medium is basic or alkaline.
- Turmeric solution: It is a yellow dye. In the acidic as well as in neutral medium, its colour remains yellow. In the basic medium the colour changes to reddish brown.

Olfactory indicators: These are chemical substances whose odour changes in acidic or basic medium.
For example, onion, vanilla and clove oil.

Reaction of acid or base with metal: Metals react with acids to liberate hydrogen gas and form salt.
Acid + Metal → Salt + Hydrogen gas

A few metals like zinc, lead and aluminium react with bases to give off hydrogen.

$$2NaOH + Zn \longrightarrow \underset{\text{(Sodium zincate)}}{Na_2ZnO_2} + H_2$$

Reaction of acids with metal hydrogen carbonate and metal carbonates: All metal carbonates and hydrogen carbonates react with acids to give the corresponding salt, carbon dioxide and water.

Metal carbonate + Acid → Salt + H_2O + CO_2
Metal hydrogen carbonate + Acid → Salt + H_2O + CO_2

For example,
$Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$
$NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$

The released CO_2 gas turns lime water milky due to formation of $CaCO_3$.

$$\underset{\text{Lime water}}{Ca(OH)_2(aq)} + CO_2(g) \longrightarrow \underset{\text{(Milky white)}}{CaCO_3(s)} + H_2O(l)$$

Neutralisation reaction: A chemical reaction between an acid and a base to give a salt and water is known as neutralisation reaction. In general neutralisation reaction can be written as

Base + Acid → Salt + Water
$NaOH + HCl \rightarrow NaCl + H_2O$

Reactions of metal oxides with acids

Metal oxide + Acid ⟶ Salt + Water

$$\underset{\text{Copper oxide}}{CuO} + 2\,\underset{\text{Hydrochloric acid}}{HCl} \longrightarrow \underset{\text{Copper chloride}}{CuCl_2} + \underset{\text{Water}}{H_2O}$$

Reactions of non-metallic oxide with base

Non-metallic oxide + Base⟶ Salt + Water

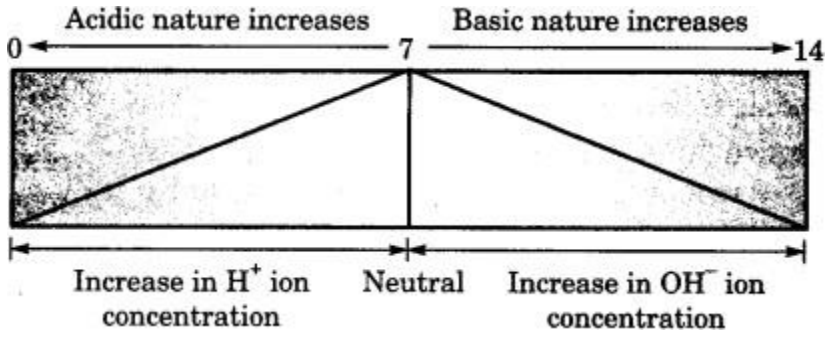
$CO_2 + Ca(OH)_2 \rightarrow CaCO_3 + H_2O$

How strong are acid or base solutions: Any aqueous solution, be it acidic, alkaline, or neutral, will have both H^+ and OH^- ions.

The solution will be either acidic or alkaline depending upon the type of ions present in the solution with the larger concentration.

A scale for measuring hydrogen ion concentration in a solution is called pH scale.

pH should be thought of simply as a number between 0-14 which indicates the acidic or basic nature of a solution. Higher the hydrogen ion concentration, lower is the pH value.



Importance of pH in everyday life:

(i) If pH of rainwater is less than 5.6, it is called acid rain. When acid rain flows into the rivers, it lowers the pH of river water. The survival of aquatic life in such rivers become difficult. Acid rain also damage crops and cause a change in pH of the soil.

(ii) pH in our digestive system: Our stomach produces digestive juices/hydrochloric acid (HCl), which helps in the digestion of food without harming the stomach. However, sometimes the stomach produces too much of acid and this causes indigestion, which is accompanied by pain and irritation. To get rid of this pain, people use antacids like magnesium hydroxide. These antacids neutralise the excess acid formed.

(iii) pH change as the cause of tooth decay: Tooth decay starts when the pH of the mouth is lower than 5.5. Tooth enamel, made up of calcium phosphate is the hardest substance in the body. It does not dissolve in water but is corroded when the pH in the mouth is below 5.5. Using toothpaste, which are generally basic, for cleaning the teeth can neutralise the excess acid and prevent tooth decay.

(iv) Bee-sting leaves an acid which causes pain and irritation. Using a mild base like baking soda on the stung area gives relief. Stinging hair of nettle leaves inject methanoic acid causing a burning pain. A traditional remedy is rubbing the area with the leaf of the dock plant.

(v) Various fluids in our body work within a particular range of pH such as, pH of human blood should be between 7.3 to 7.5.

(vi) For the growth of plants, a particular pH range of soil is essential. Usually, neutral soil is best for crops. If the soil is acidic, farmers treat the soil with quick lime or slaked lime.

(vii) The tarnished surface of a copper vessel due to the formation of copper oxide layer (which is basic) can be cleaned by rubbing with lemon (which is acidic).

Salts: Salts are generally ionic compounds which are obtained by neutralisation reaction between acids and bases.

Acid + Base→ Salt + Water
$HCl + NaOH \rightarrow NaCl + H_2O$

Salts of a strong acid and a strong base are neutral with pH value of 7. On the other hand, salts of strong acid and weak base are acidic with pH values less than 7 and those of strong base and weak acid are basic in nature, with pH value more than 7.

Sodium hydroxide is manufactured by electrolysis of an aqueous solution of sodium chloride (called brine). Chlorine gas is given off at the anode and hydrogen gas at the cathode. Sodium hydroxide solution is formed near the cathode.
$2NaCl + 2H_2O \rightarrow 2NaOH + Cl_2 + H_2$

The process is called the chlor-alkali process.

Uses of Sodium Hydroxide

1. Sodium hydroxide is used for making soaps and detergents.
2. Sodium hydroxide is used for making artificial textile fibres (such as rayon).
3. It is used the preparation of soda lime (a mixture of NaOH and CaO).
4. It is used as a cleansing agent for machines and metal sheets.

Baking Soda ($NaHCO_3$): The chemical name of baking soda is sodium hydrogen carbonate or sodium bicarbonate ($NaHCO_3$). It can be prepared from sodium chloride as
$NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$

Since it is slightly soluble in water, it can be removed by filtration.
It is a mild non-corrosive base. The following reaction takes place when it is heated during cooking.

$$2NaHCO_3 \xrightarrow{\text{Heat}} Na_2CO_3 + H_2O + CO_2$$

Uses of Baking Soda

Being alkaline it is an ingredient in antacids. It neutralises excess acid in the stomach and provides relief.
$NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$

- It is used in soda-acid fire extinguisher.
- It is used in making baking powder (a mixture of baking soda and mild edible acid like tartaric acid). When baking powder is heated or mixed in water CO_2 gas is released.
  $NaHCO_3$ (aq)+ H^+(aq)$\rightarrow$ CO_2 (g)+ H_2O (l)+ Sodium salt of acid

The released CO_2 causes breads or cakes to rise making them soft and spongy/fluffy.

Bleaching Powder [$CaOCl_2$]: Bleaching powder is calcium oxychloride. It is also known as chloride of lime. Bleaching powder can be prepared by the action of chlorine on dry slaked lime [$Ca(OH_2)$].
$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$
Bleaching powder is a yellowish white solid.

Uses of Bleaching Powder

- It is an oxidising agent.
- It is used for disinfecting drinking water to make it free from germs.
- The most important use of bleaching powder is in:
- textile industry for bleaching cotton and linen
- paper industry for bleaching wood pulp
- laundry for bleaching washed clothes.

Washing Soda [$Na_2CO_3.10H_2O$]: Sodium carbonate is obtained by heating baking soda. When the sodium carbonate obtained by the above process is recrystallised, we get washing soda.

$Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3.10H_2O$

Anhydrous sodium carbonate is called soda ash.

Uses of Washing Soda

- It is used in glass, soap and paper industries.
- It is used in the manufacture of borax.
- It is used as a cleaning agent for domestic purposes.
- It is used for removing permanent hardness of water.

Plaster of Paris ($CaSO4 \cdot 1/2H2O$)

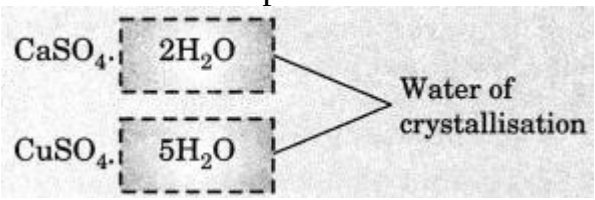
Plaster of Paris is calcium sulphate hemihydrate, it can be obtained by heating gypsum at 373 K.

Plaster of Paris is a white powder and on mixing with water, it changes to gypsum once again giving a hard solid mass.

$$\underset{\text{Plaster of Paris}}{CaSO_4.\frac{1}{2}H_2O} + 1\frac{1}{2}H_2O \longrightarrow \underset{\text{(Gypsum)}}{CaSO_4.2H_2O}$$

Water of Crystallisation.

In washing soda, ($Na_2CO_3.10H_2O$), $10H_2O$ signify water of crystallisation. Water of crystallisation is the fixed number of water molecules present in one formula unit of a salt. Some other examples are



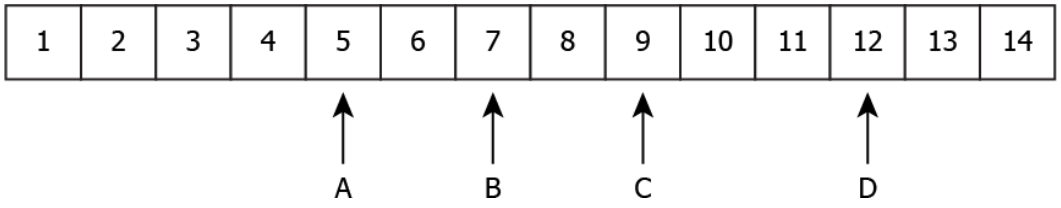
Uses of Plaster of Paris

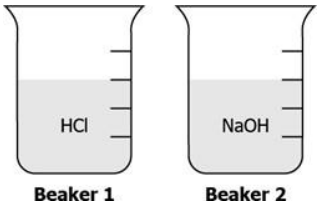
- Plaster of Paris is used by doctors as plaster for supporting fractured bones in the right position.
- It is also used for making toys, materials for decoration and for making surfaces smooth.

SECTION A

MULTIPLE CHOICE QUESTIONS

1.	What happens when a solution of an acid is mixed with a solution of a base in a test tube? (i) The temperature of the solution increases (ii) The temperature of the solution decreases (iii) The temperature of the solution remains the same (iv) Salt formation takes place (a) (i) only (b) (iii) and (iv) (c) (iii) Only (d) (i) and (iv)
2.	Identify the basic salt from the following salts: (A) Na_2CO_3 (B) NH_4Cl (C) $NaNO_3$ (D) KCl
3	Q. 3. Which one of the following can be used as an acid– base indicator by a visually impaired student? (A) Litmus (B) Turmeric (C) Vanilla essence (D) Petunia leaves
4	During the preparation of hydrogen chloride gas on a humid day, the gas is usually passed through the guard tube containing calcium chloride. The role of calcium chloride taken in the guard tube is to (A) absorb the evolved gas. (B) moisten the gas (C) absorb moisture from the gas. (D) absorb Cl– ions from the evolved gas.

5	A milk man adds a very small amount of baking soda to fresh milk. Why? (A) To increase the rate of fermentation (B) To decrease the rate of fermentation (C) To increase its quality (D) To make paneer
6	The image shows the pH values of four solutions on a pH scale.  Out of above 4 solutions, which solution/solutions will give red colour with methyl orange indicator. a) A only b) B and C c) C and D d) A and D
7	Which of the following are present in a dilute aqueous solution of hydrochloric acid? (A) $H_3O^+ + Cl^-$ (B) $H_3O^+ + OH^-$ (C) $Cl^- + OH^-$ (D) Unionized HCl Ans. Option
8	Which of the following salts does not contain water of crystallisation? (A) blue vitriol (B) Baking soda (C) Washing soda (D) Gypsum

9	Which one of the given is true, if a substance has a pH value of 7? (a) The substance is a base (b) The substance is an acid (c) The substance is a neutral substance (d) Either (A) or (B)
10	A student placed 20 ml HNO3 and 20ml NaOH in two separate beakers as shown. In beaker 1, 8 mL of NaOH is added where as in beaker 2, 8 ml of HNO3 is added. The student noted the possible change in pH in both solutions.  **Change in pH (beaker 1)** / **Change in pH (beaker 2)** A: Increase / Increase B: Decrease / Increase C: Increase / Decrease D: Decrease / Decrease Which pH change is correct (a) A b) B c) C d)D
11	A strong acid: (a) Completely gets ionized in water (b) Partially gets ionized in water (c) Do not get ionized in water (d) None of these

12	Which of the following statement is correct about an aqueous solution of an acid and of a base? (i) Higher the pH, stronger the acid (ii) Higher the pH weaker the acid (iii) Lower the pH ,stronger the base (iv) Lower the pH,weaker the base (a) i & iii (b) ii & iii (c) I & iv (d) ii & iv
13	The table provides the pH of four solutions P, Q, R and S SOLUTION | pH VALUE P | 2 Q | 9 R | 5 S | 11 Which of the following correctly represents the solutions in increasing order of their hydronium ion concentration (a) P > Q > R > S (b) P > S > Q > R (c) S < Q < R < P (d) S < P < Q < R
14	Due to excess passing of CO2 through an aqueous solution of slaked lime, its milkiness fades because (a) Calcium carbonate is produced (b) Calcium bi-carbonate is produced

	(c) Calcium oxide is produced (d) Due to the production of more heat
15	Generally, when certain metals react with an acid they release____gas. (a) Nitrogen (b) Oxygen (c) Hydrogen (d) Argon

SECTION B
ASSERTION/REASON TYPE QUESTIONS

	ASSERTION-REASON TYPE QUESTIONS The following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true and R is not the correct explanation of A C. A is true but R is false D. A is False but R is true
1.	Assertion (A): The aqueous solutions of glucose and alcohol do not show acidic character. Reason (R): Aqueous solutions of glucose and alcohol do not give H+ ions
2.	Assertion (A): Pure water is neither acidic nor basic. Reason (R): The pH of a solution is inversely proportional to the concentration of hydrogen ions in it.
3.	Assertion (A): The water must always be added to acid with constant stirring. Reason (R): Mixing of an acid with water decreases the concentration of H+ ions per unit volume.
4.	Assertion : Non-metallic oxides are acidic is nature. Reason : Non-metallic oxides react with base to form salt and water just like an acid reacts with a base.

5.	Assertion : HCl produces hydronium ions (H3O+) and chloride ions (Cl-) in aqueous solution. Reason : In presence of water, base give H+ ions.
6.	Assertion : Salts of strong acids and weak bases are neutral in nature. Reason : pH value of such salt are more than 7
7	Assertion : On heating, colour of hydrated copper sulphate changes from blue to white. Reason :On strong heating , Copper sulphate crystals lose all the water of crystallization and form anhydrous salt.
8	Assertion : Limestone, chalk and marble react with acids to form salt, carbon dioxide and water. Reason : Limestone, chalk and marble are different forms of calcium carbonate
9	Assertion : pH of ammonium chloride solution is in basic range. Reason : Solution of a salt of strong base and weak acid is basic.
10	Assertion: Weak acids have low electrical conductivity. Reason : Concentration of hydrogen ion is equal in strong and weak acids.

SECTION C
CASE STUDY BASED QUESTIONS

pH is quite useful to us in several ways in daily life. Plants need a specific pH range for proper growth. The soil may be acidic, basic, or neutral depending upon the relative concentration of H^+ and OH^-. The pH of any soil can be determined by using pH paper. If the soil is too acidic, it can be corrected by adding lime to it. If the soil is too basic, it can be corrected by adding organic manure which contains acidic materials. Stings of bees and ants contain methanoic acid. When stung, it causes lot of pain and irritation. This can be cured by rubbing the affected area with mild base like baking soda.

1. Which of the following acids is present in ant sting?

(a) Formic acid

(b) Acetic acid

(c) Citric acid

(d) Hydrochloric acid

2. The pH of soil X is 7.5 while that of soil Y is 4.5. Which of the two soils, should be treated with powdered chalk to adjust its pH ?

(a) X only

(b) Y only

(c) Both X and Y

(d) none of these

3. Sting of ant can be cured by rubbing the affected area with soap.

(a) It contains oxalic acid.

(b) It contains aluminium hydroxide

(c) It contains sodium hydroxide

(d) None of these

4.Antacids are used to cure acidity. An antacid contains

(a) Sodium hydroxide

(b) Magnesium hydroxide

(c) Calcium hydroxide

(d) Potassium hydroxide

CASE STUDY 2

2.Baking powder produces carbon dioxide on heating, so it is used in bakeries to make batter spongy. Although baking soda also produces CO_2 on heating, it is not used in bakeries because on heating, baking soda produces sodium carbonate along with carbon dioxide. Sodium carbonate makes the taste bitter. Baking powder is a mixture of baking soda and mild edible acid. Generally tartaric acid is mixed with baking soda to make baking powder. When baking powder is heated, $NaHCO_3$ decomposes to give CO_2 which makes bread and cake fluffy. Tartaric acid helps to remove bitter taste due to formation of sodium tartrate.

1.On passing excess CO_2 gas in aqueous solution of sodium carbonate, the substance obtained is:

(a) NaOH

(b) $NaHCO_3$

(c) $Na_2CO_3.10\ H_2O$

(d) $NaNO_3$

2. When sodium hydrogen carbonate is added to acetic acid, it evolves a gas. Which of the following statements are true about the gas evolved?

(i) It turns lime water milky.

(ii) It extinguishes a burning splinter

(iii) It is white in colour

(iv) It has a pungent smell

(a) (i) & (ii)

(b) (i), (ii) & (iii)

(c) (i) & (iv)

(d) (i) 7 (iii)

3. Select the correct statement regarding sodium hydrogen carbonate.

(a) CO and CO_2 are produced during the heating of $NaHCO_3$

(b) It is an ingredient in antacid.

(c) It is used in soda-acid fire extinguisher

(d) All of these.

4. Which of the following statement is wrong regarding baking soda.

(a) Baking soda is sodium hydrogen carbonate.

(b) On heating baking soda, it gives sodium carbonate.

(c) It is used in manufacture of soap.

(d) It is an ingredient in baking powder.

CASE STUDY3

Indicator is a chemical compound which is added to the solution in very small quantity to detect its acidic or basic nature. As they show colour change in acidic and basic medium, they are also called acid-base indicators. Indicators, basically are coloured organic substances either extracted from plants (natural indicators) or in the laboratory (synthetic indicators) A few common acid base indicators are : litmus, phenolphthalein, methyl orange etc. In addition to these are some naturally occurring substances which have different smell in acidic and basic medium. These substances are called olfactory indicators.

1. Which of the following will turn red litmus blue?

(a) Vinegar

(b) Baking soda

(c) Lemon juice

(d) Soft drink

2. A solution turns blue litmus red. The pH of the solution is probably:

(a) 8

(b) 10

(c) 12

(d) 6

3. A solution in test-tube ‘A’ turns red litmus blue and evolves hydrogen gas on reaction with zinc and does not react with sodium carbonate. Whereas solution in test-tube ‘B’ turns blue litmus red, liberated hydrogen gas on reaction with zinc and evolves carbon dioxide gas with sodium carbonate. Identify A and B.

(a) A is acid and B is base

(b) A is base and B is acid

(c) Both a and B are bases

(d) Both A and B are acids

4. Which of the following can be used as an acid-base indicator by visually impaired student?

(a) Litmus

(b) Turmeric

(c) Vanilla essence

(d) methyl orange

ANSWER KEY

Multiple choice questions

Q.N.	1	2	3	4	5
ANS.	d	a	c	c	b
Q .N.	6	7	8	9	10
ANS.	a	a	b	c	c
Q.N.	11	12	13	14	15
ANS.	a	d	c	b	c

ASSERTION REASON QUESTIONS (Answer key)

Q.N.	1	2	3	4	5
ANS.	a	b	d	a	c
Q.N.	6	7	8	9	10
ANS.	c	a	a	d	c

Case study I

1. (a) Formic acid
2. (b) Y only
3. (c) It contains sodium hydroxide
4. (b) Magnesium hydroxide

Case study II

1. (b) $NaHCO_3$
2. (a) (i) & (ii)
3. (d) All of these
4. (c) It is used in manufacture of soap

Case study III

1. (b) Baking soda
2. (d) 6
3. (b) A is base and B is acid
4. (b) Turmeric

****

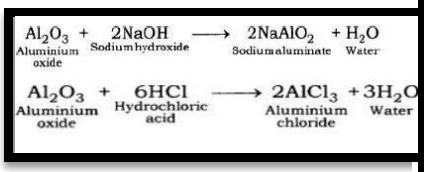
CHAPTER 3
METALS AND NON- METALS

FOCUS AREA

Elements are classified broadly into two categories on the basis of properties:
Metals, Iron, Zinc, Copper, Aluminum etc.
Non – metals: Chlorine, Nitrogen, Hydrogen, Oxygen, Sulphur etc.
Apart from metals and non-metals some elements show properties of both metals and non – metals, called metalloids e.g. Silicon, Arsenic, Germanium

Metals are lustrous, malleable, ductile and good conductors of heat and electricity, mostly solids, form positive ions and basic oxides. Non-metals are non-lustrous, brittle, exist as soilds, liquids and gases, non-conductor of heat and electricity, form negative ions and acidic oxides mostly. Some metals form amphoteric oxides and some non-metals form neutral oxides. A more reactive metal can displace less reactive metal from its salt solution. Some less reactive metals occur in free state. Metals form ionic compounds with non-metals. Ionic compounds are soluble in water, high melting solids, conduct electricity in molten state and in aqueous solution.

Physical Properties of Metals
 Hard and have a high tensile strength.
 Solids at room temperature
 lustrous
 malleable
 ductile • Gold is the most ductile metal.
 Sonorous
 Good conductors of heat and electricity.
 Metals have generally high melting and boiling points
• Silver and copper are the best conductor of heat.
Exceptions
 All metals except mercury exist as solids at room temperature.
 Metals have high melting points but gallium and caesium have very low melting points. These two metals will melt if you keep them on your palm.
 Iodine is a non-metal but it is lustrous.
 Carbon is a non-metal that can exist in different forms. Each form is called an allotrope. Diamond, an allotrope of carbon, is the hardest natural substance known and has a very high melting and boiling point. Graphite, another allotrope of carbon, is a conductor of electricity.
 Alkali metals (lithium, sodium, potassium) are so soft that they can be cut with a knife. They have low densities and low melting points
Comparison of chemical properties of Metals and Non metals

1	Reaction with Oxygen Amphoteric oxides	Metal + Oxygen→Metal oxide $4Na(s)+O_2(g)\rightarrow 2Na_2O(s)$ $4Al(s)+3O_2(g)\rightarrow 2Al_2O_3$ Metals form basic oxides Zn and Al form amphoteric oxides (they show the properties of both acidic and basic oxides)  	Non-metal + Oxygen → Non-metal oxide $C+O_2\rightarrow CO_2$ $S+O_2\rightarrow SO_2$ Non-metals form acidic oxides. CO and H_2O are neutral oxides(they are neither acidic nor basic in nature) Non-metal oxides are soluble in water. They dissolve in water to form acids $SO_2+H_2O\rightarrow H_2SO_3$
2	Reaction with water	Metals react with water to form metal oxides or metal hydroxide and H2 gas is released. $2Na(s)+2H_2O(l)\rightarrow 2NaOH+H_2(g)+heat$	Non-metals do not react with water, steam to evolve hydrogen gas. Because Non-metals cannot give electrons to hydrogen in water
3	Reaction with dilute Acids	Metal + Acid→Metal salt + Hydrogen $2Na(s)+H_2SO_4\rightarrow Na_2SO_4(aq)+H_2(g)$ Metal + $HNO_3\rightarrow$ H_2 gas is not released. Reason-HNO_3 is strong oxidizing agent (EXCEPT Mg and Mn $Mn+2HNO_3\rightarrow Mn(NO_3)_2+H2(g)$ from HNO_3) Nitric acid is strong oxidising agent and it oxidises the hydrogen gas (H_2) to water (H_2O) and itself get reduced to some oxide of nitrogen like nitrous oxide , nitric oxide and nitrogen dioxide *Magnesium (Mg) and manganese (Mn) react*	Non-metals do not react with acids to release H_2 gas. Reason- Non-metals cannot lose electrons and give It to Hydrogen ions of acids so that the gas is released.

		with very dilute HNO_3 to evolve H_2 gas	
4	Reaction with salt solutions	When metals react with salt solution, more reactive metal will displace a less reactive metal from its salt solution. $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$	When non-metals react with salt solution, more reactive non-metal will displace a less reactive non-metal from its salt solution. $2NaBr(aq) + Cl_2(g) \rightarrow 2NaCl(aq) + Br_2(aq)$
5	Reaction with Chlorine	Metal + Chlorine → Metal Chloride Ionic bond is formed. Therefore it is an Ionic compound	Non-metal + Chlorine →Non-metal Chloride covalent bond is formed. Therefore it is a covalent compound.

 Metals such as potassium and sodium react so vigorously that they catch fire if kept in the open. Hence, to protect them and to prevent accidental fires, they are kept immersed in kerosene oil.

 At ordinary temperature, the surfaces of metals such as magnesium, aluminium, zinc, lead, etc., are covered with a thin layer of oxide. The protective oxide layer prevents the metal from further oxidation.

 Iron does not burn on heating but iron filings burn vigorously when sprinkled in the flame of the burner. To burn the surface of iron in contact with air must be heated to its ignition temperature. Iron has a strong molecular force of attraction. Hence when heated it doesn't reach to its ignition temperature and doesn't burn. But iron fillings when sprinkled in flames attain the ignition temperature, as iron fillings are comparatively smaller particles and gain larger surface area for the reaction. Therefore they burn vigorously.

 Copper does not burn, but the hot metal is coated with a black coloured layer of copper(II) oxide. Silver and gold do not react with oxygen even at high temperatures.

. Most of the metals do not react with water.
Alkali metals react vigorously with water.

 Metals like potassium and sodium react violently with cold water. In case of sodium and potassium, the reaction is so violent and exothermic that the evolved hydrogen immediately catches fire.

Reaction of Calcium metal with Water

The reaction of calcium with water is less violent. The heat evolved is not sufficient for the hydrogen to catch fire. Calcium starts floating because the bubbles of hydrogen gas formed stick to the surface of the metal.

Reaction of Magnesium metal with Water

Magnesium does not react with cold water. It reacts with hot water to form magnesium hydroxide and hydrogen. It also starts floating due to the bubbles of hydrogen gas sticking to its surface.

 Metals like aluminium, iron and zinc do not react either with cold or hot water. But they react with steam to form the metal oxide and hydrogen.

3. Reaction of metals with acid:

Metals react with acids to give a salt and hydrogen gas.

Metal + Dilute acid → Salt + Hydrogen

 Hydrogen (H_2) gas is not evolved when metal is treated with nitric acid (HNO_3):

4. Displacement reactions

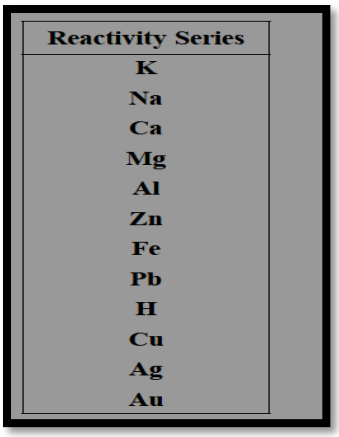
In this reaction, more reactive metal displaces the less reactive metal from its salt.

Metal A + Salt solution of B → Salt solution of A + Metal B

Eg: Iron displaces copper from copper sulphate solution.

The Reactivity Series

The reactivity series is a list of metals arranged in the order of their decreasing activities. In the reactivity series, copper, gold, and silver are at the bottom and hence, least reactive. These metals are known as Noble metals. Potassium is at the top of the series and hence, most reactive.

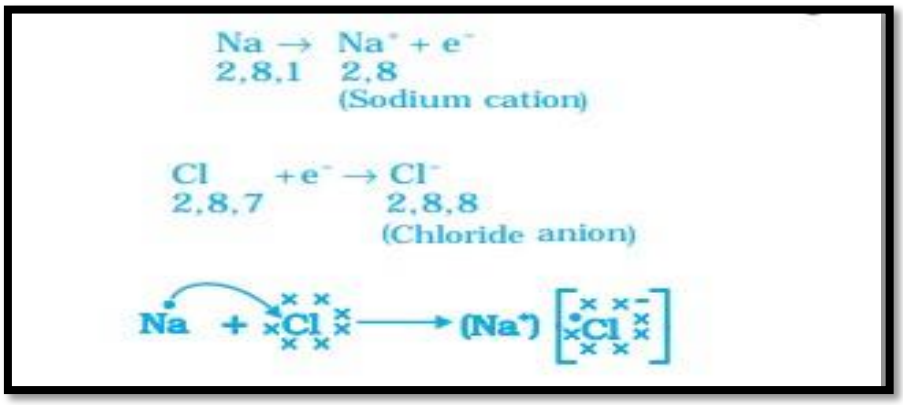


Ionic bonding

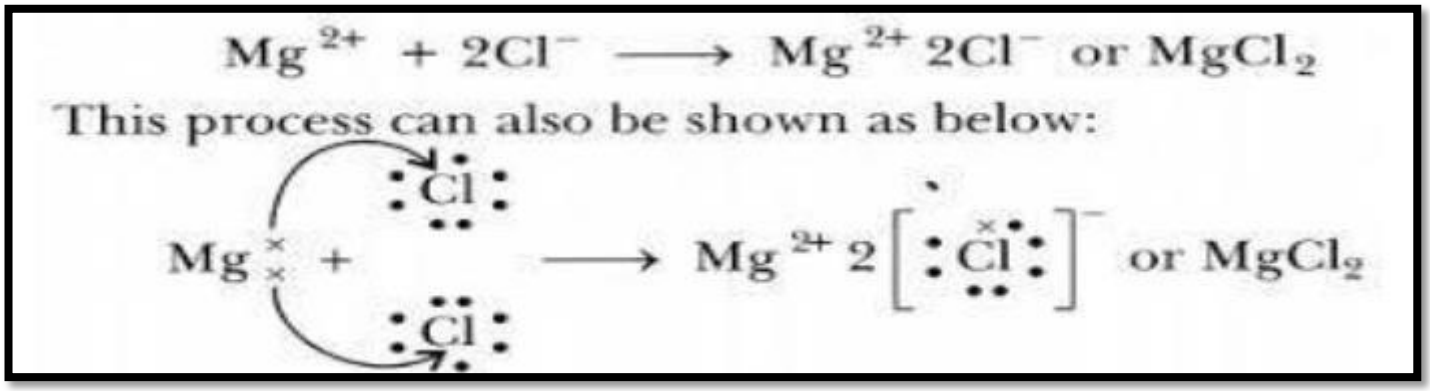
Ionic bonding is the complete transfer of valence electron(s) between atoms. It is a type of chemical bond that generates two oppositely charged ions. In ionic bonds, the metal loses electrons to become a positively charged cation, whereas the nonmetal accepts those electrons to become a negatively charged anion. Ionic bonds require an electron donor, often a metal, and an electron acceptor, a nonmetal.

Formation of Sodium Chloride (NaCl):

In sodium chloride, sodium is a metal and chlorine is a non-metal.



FORMATION OF MAGNESIUM CHLORIDE (IONIC COMPOUND)



Properties of ionic compounds

1. Physical nature: solid and hard due to strong force of attraction. (generally brittle) Ionic bond has a greater force of attraction because of which ions attract each other strongly. This makes ionic compounds solid.

2. Melting point and boiling point: have high M.P and B.P, as large amount of heat energy is required to break strong ionic attraction. because force of attraction between ions of ionic compounds is very strong.

3. Solubility: soluble in water and insoluble in kerosene and petrol.

4. Conduction of electricity: (a) ionic compounds in solid state are does not conduct electricity.

Reason—Ions cannot move due to rigid solid structure. (b)Ionic compounds conduct electricity in molten state.

The solution of ionic compounds in water conduct electricity. This happens because ions present in the solution of ionic compound facilitate the passage of electricity by moving towards opposite electrodes.
 Ionic compounds conduct electricity in the molten state.

Reason--Ions can move freely since the electrostatic forces of attraction between the oppositely charged ions are overcome due to heat.

SECTION A
MULTIPLE CHOICE QUESTIONS

1.An element X is soft and can be cut with a knife. This is very reactive in air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following:

a) Mg

b) Na

c) P

d) Ca

2.The property of metals being beaten into thin sheets is called

a) Malleability
b) Ductility
c) Brittle
d) None of these

3. Read the statements carefully.

i Metals are generally ductile but metal W is the most ductile metal.

ii Metals generally possess high melting point but metals like X have very low melting point.

iii Metals generally exist in solid state but Y exists in liquid state.

iv. Among metals, Z is the poorest conductor of heat.

Choose the right option of sequencing W, X, Y and Z.

(a) Aluminium, Sodium, Lead and Silver.
(b) Gold, cesium, Mercury and Lead.
(c) Copper, Zinc, Silver and Mercury.
(d) Iron, Sodium, Gold and Lead.

4. $Al_2O_3 + 2NaOH \rightarrow \ldots\ldots + H_2O$
a) $2Al(OH)_3$
b) $2 Na_2O$
c) $2 NaAlO_2$
d) $2AlNaO_2$

5.The best conductors of heat are
a) Silver and Copper
b) Lead and Mercury
c) Iron and Tin
d) Gold and Platinum

6. A student performs some activities on two substances and records the observations in a table as shown.

Activity	Substance M	Substance N
cut with a knife	forms small pieces	forms small pieces
beaten with hammer	shape changes	changes into powder
struck with metal rod	makes a sound	changes into powder

Which option classifies the substances into metals and non-metals?
(a) both the substances are metals
(b) both the substances are non-metals
(c) substance M is metal while substance N is non-metal
(d) substance M is non-metal while substance N is metal

7.When Calcium reacts with water it starts floating on top of water because

a) bubbles of carbon dioxide formed stick to the surface of metal
b) bubbles of hydrogen formed stick to the surface of metal
c) Calcium is lighter than water
d)) None of the above

8.The reactivity series is a list of metals arranged in order of
a) Increasing reactivity
b) Increasing and decreasing reactivity
c) Decreasing reactivity
d) None of the above
9. Generally, non-metals are bad conductors of electricity. Which of the following is an exception to this?
a. diamond
b coal
c. graphite
d. coke

10.A student adds some metallic ash in water taken in a test tube. The ash gets completely dissolved in water and the solution changes its colour. What should the student do next to test the chemical properties of the product formed?
(a) Evaporate the solution to get crystals.
(b) Measure the temperature change using a thermometer.
(c) Test the acidity using a blue litmus paper.
(d) Test the basicity using a red litmus paper.

11.Which of these is a property of ionic compound?

a. They do not form crystals

b They have low melting points and boiling points

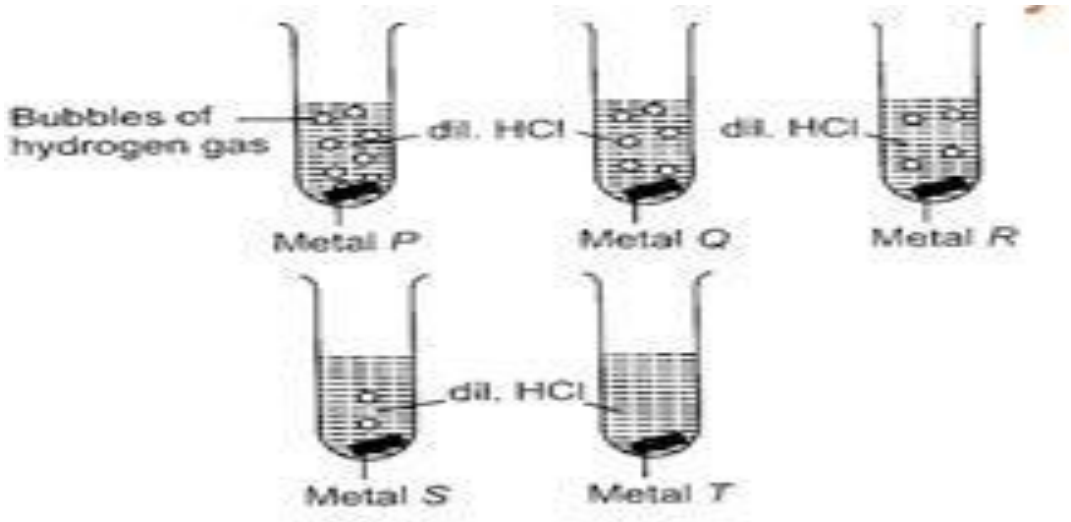
c. They conduct electricity in solution and molten state.

d. They are generally soluble in solvents like Kerosene, petrol

12.Reaction between X and Y forms compound Z and X loses electron and Y gains electron. Which of the following properties is Not shown by Z ?
(a) Has high melting point
(b) Insoluble in water
(c) Conducts electricity in molten state
(d) Occurs as solid

13. What happens when a pellet of sodium is dropped in water?
(a) It catches fire and forms oxide.
(b) It absorbs heat and forms oxide.

(c) It catches fire and forms hydroxide.
(d) It absorbs heat and forms hydroxide.
14. In general the number of electrons in the outermost shell of the metal is
a)1 to 3
b)1
c)5 to 8
d)8
15. Amphoteric oxides are
A. metal oxides which do not react with acids but react with bases
B. metal oxides which shows no reaction with either acids or bases
C. metal oxides which reacts with acids but do not react with bases
D metal oxides which reacts with both acids as well as bases
16. Observe the rate of evolution of hydrogen gas with five metals P, Q, R, S and T at room temperature. What could be the metals P, Q, R, S and T?



S.No	P	Q	R	S	T
(a)	Zn	Al	Mg	Cu	Fe
(b)	Mg	Al	Zn	Fe	Cu
(c)	Al	Zn	Mg	Fe	Cu
(d)	Fe	Zn	Mg	Al	Cu

17. The electronic configurations of three elements X, Y and Z are

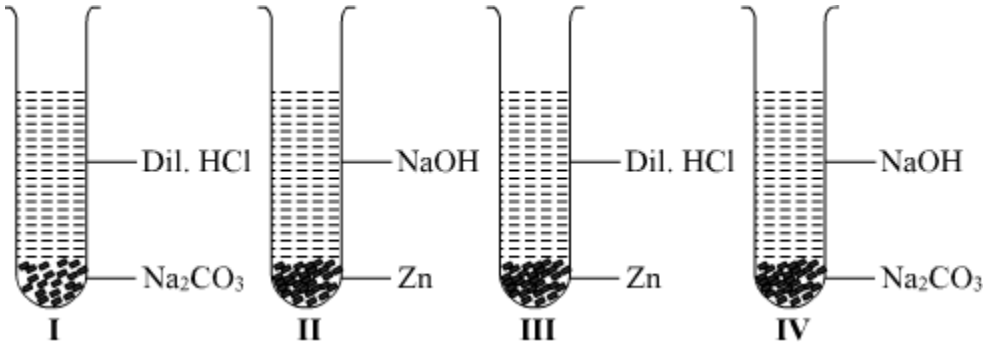
X — 2, 8; Y — 2, 8, 7 and Z — 2, 8, 2. Which of the following is correct?

(a) X is a metal (b) Y is a metal (c) Z is a non-metal(d) Y is a non-metal and Z is a metal

18. A metal oxide 'X 'reacts with HCl produce a salt and water.

‘ X’ also reacts with NaOH to give a different salt and water. ‘X’ may be
a. K_2O
b. Al_2O_3
C. ZnO
d . b or c

19. Four students were asked by their teacher to arrange the set up I-IV as given below and identify the gas evolved in each case, if any.



After observation, they arrived at the following inferences and recorded their observations in the form of a table as given below:

STUDENT	I	II	III	IV
A	H2	No gas	CO2	H2
B	CO2	H2	No gas	CO2
C	CO2	H2	H2	No gas
D	No gas	CO2	CO2	H2

Find which student recorded the correct observation?
a)A
b)B
c)C
d)D

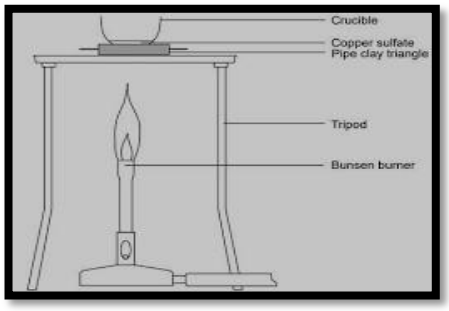
20. Which of the given non-metal is a liquid?
a) Hydrogen
b) Bromine
c) Chlorine
d) Mercury

21. Which of the following non-metal is lustrous?
(a) Sulphur
(b) Oxygen
(c) Nitrogen
(d) Iodine

22. Which of the following pair of metals exist in their native state in nature?
(a) Ag and Au
(b) Ag and Zn
(c) Au and Hg
(d) Au and Fe

23. Pihu took some crystals of copper sulphate and heated it.

After some time, she added water to the content of test tube.



The two visible changes observed here are
a Blue crystals changes to white powder, on adding water it regains its blue colour.
b Blue crystals changes to pale green, on adding water it regains its blue colour.
c No change
d Blue crystals changes to white crystals and become colourless

24. What happens when dilute sulphuric acid is poured on silver plate:-
(a) Silver sulphate is formed
(b) SO2 gas is evolved
(c) No reaction takes place
(d) Hydrogen gas is evolved

25. Which of the following metal reacts with water/steam to produce oxide instead of hydroxide?

(a) Sodium (b) Potassium (c) Calcium (d)Aluminium

26. A highly reactive element X stored in water. This is very reactive with air and cannot be kept open in air. Identify the element from the following
(a) Mg
(b) Na
(c) P
(d) Ca

27. Generally metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)?
(a) H_2SO_4
(b) HCl
(c) HNO_3
(d) All of these

28. The chemical reaction between a piece of copper and nitric acid is given by the chemical equations,
$Cu + HNO_3 \longrightarrow Cu(NO_3)_2 + H_2$
$H_2 + HNO_3 \longrightarrow H_2O + NO_2$
What can be inferred from the chemical equation?
(a) Copper causes the oxidation of HNO_3 to form NO_2.
(b) Hydrogen gas gets oxidized by HNO_3 to form water.
(c) gas reacts with oxygen in the air to form water.
(d) Nitrate reacts with hydrogen to form NO_2 and H_2O.

29. Chemical formula of rust is:-

(a) Fe_2O_3
(b) $Fe_2O_3.x\ H_2O$
(c) FeO
(d) Fe_3O_4

30. A metal which is exists in liquid state at room temperature.
a) Na
b) Ag
c) Hg
d) Au
31. Which property of metals is used for making bells and strings of musical instruments like Sitar and Violin?
(a) Sonorous
(b) Malleable
(c) Ductile
(d) Conductivity

32. The electronic configuration of three elements X, Y and Z are as follows:
X = 2, 4, Y = 2, 8,1, Z = 2,8,7, if two of these elements combine to form an ionic compound , the correct formula is:-
(a) YZ (b) X_2Y (c) XZ_3 (d) Y_2Z

33. Nature of metal oxides are:
a) acidic
b) basic
c) amphoteric
d) neutral

34. The colour of aqueous solution of zinc sulphate as observed in the laboratory is:
a) Green
b) Yellow
c) Blue
d) Colourless

35. Which of the following are not ionic compounds?
(i) KCl (ii) HCl (iii) CCl4 (iv) NaCl
(a) (i) and (ii)
(b) (ii) and (iii)
(c) (iii) and (iv)
(d) (i) and (iii)

36. Which of the following are most malleable metals?

a Sodium and potassium
b) calcium and magnesium
c) gold and silver
d) zinc and lead

37. Copper becomes green when exposed to moist air for a long period of time due to the
a) formation of a layer of cupric oxide on the surface of copper.
b) formation of a layer of basic carbonate on the surface of copper.
c) formation of a layer of cupric hydroxide on the surface of copper.
d) none of the above.

38. A student learns that sodium and magnesium react with chlorine to form sodium chloride and magnesium chloride, as shown.

$2Na + Cl_2 \rightarrow 2NaCl$ and $Mg + Cl_2 \rightarrow MgCl_2$

The melting point of sodium chloride is 1074 K while the melting point of magnesium chloride is 981 K. Why does sodium chloride and magnesium chloride have a difference in melting point?

(a) Magnesium chloride is soluble in kerosene and petrol.
(b) Sodium chloride is formed by combining with one molecule of chlorine.
(c) Sodium chloride has strong inter-ionic bonding than magnesium chloride.
(d) chloride is formed by combining only one molecule of magnesium.

39.Which of the following pair will show displacement reaction?
i) $CuSO_4$ solution and Iron metal
ii) $MgCl_2$ solution and aluminum metal
iii) $FeSO_4$ solution and silver metal
iv) $AgNO_3$ solution and copper metal
(a) (i) and (iv)
(b) (ii) and (iii)
(c) (iii) and (iv)
(d) (i) and (iii)
40Aluminium is used for making cooking utensils. Which of the following properties of Aluminium are responsible for the same?
(i) Good thermal conductivity
(ii) Good electrical conductivity
(iii) Ductility
(iv) High melting point
(a) (i) and (ii)
(b) (i) and (iii)
(c) (i) and (iv)
(d) (ii) and (iii)

41What happens when calcium is treated with water?
(i) It does not react with water
(ii) It reacts violently with water
(iii) It reacts less violently with water
(iv) Bubbles of hydrogen gas formed stick to the surface of calcium
(a) (i) and (ii) (b) (i) and (iii) (c) (ii) and (iii) (d) (iii) and (iv)

42. An aluminium strip is kept immersed in a freshly prepared ferrous sulphate solution taken in a test tube, the change observed is that
a) Green solution slowly gets decolourised with brown deposits.
b) Lower end of the test tube becomes slightly warm
c)A colourless gas with smell of burning sulphur is evolved
c)Light green solution changes to blue

43. 2 ml each of concentrated HCl, HNO_3 and a mixture of concentrated hydrochloric acid and Concentrated nitric acid in the ratio of 3:1were taken in test tubes labelled as A, B and C, A small piece of metal was put in each test tube. No change occurred in test tubes A and B but the metal dissolved in test tube C. The metal could be:
a) Al b) Au c) Pt d) Cu

44. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be:

(i) calcium (ii) carbon (iii) silicon(iv) Magnesium

45.A student makes an electric circuit using an LED, a battery and connecting wires to test the conductivity of distilled water .The student notices that the LED does not glow. He replaces the distilled water with a salt solution and observes that the LED glows. How does the salt solution help the LED to glow?

(a) Salt solution is covalent in nature and conducts electricity.

(b) Salt solution has a low melting point which allows the current to flow through it.

(c) Salt solution has a high boiling point which allows the flow of current in the circuit without getting hot.

(d) Salt solution contain ions which makes it conductive and allows the electricity to flow through it.

46An element reacts with oxygen to form an oxide which dissolves in dilute hydrochloric acid .The oxide formed also turns a solution of red litmus blue. The element will be ……..

a)metal

b) non metal

c) both a and b

d) none of these.

47. The composition of aqua-regia is

(a) Dil.HCl: Conc. HNO_3 3: 1

(b) Conc.HCl: Dil. HNO_3 3 : 1

(c) Conc.HCl: Conc.HNO_3 3 : 1

(d) Dil.HCl: Dil.HNO_3 3: 1

48 Which one of the following four metals would be displaced from the solution of its salts by the other three metals?

(a) Mg

(b) Ag

(c) Zn

(d) Cu

49 Which among the following statements is incorrect for magnesium metal?

(a) It burns in oxygen with a dazzling white flame

(b) It reacts with cold water to form magnesium oxide and evolves hydrogen gas

(c) It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas

(d) It reacts with steam to form magnesium hydroxide and evolves hydrogen gas

50. Silver articles become black on prolonged exposure to air. This is due to the formation of

(a) Ag_3N

(b) Ag_2O

(c) Ag_2S

(d) Ag_2S and Ag_3N

SECTION B
ASSERTION/REASON TYPE QUESTIONS

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

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true and R is not the correct explanation of A

C . A is true but R is false

D. A is False but R is true

1. Assertion : Ionic compounds have high melting and boiling points .

Reason : A large amount of energy is required to break the strong inter-ionic attraction in ionic compounds.

2. Assertion Magnesium chloride is an ionic compound.
Reason Metals and non-metals react by transfer of electrons

3. Assertion Gold , Silver , Platinum are metals which are used for making jewelleries
Reason Gold , silver ,Platinum are very expensive metals

4. Assertion The colour of copper sulphate solution changes when iron nail is dipped in it for 30 minutes .

Reason Copper being more reactive reacts with iron nails .

5. Assertion Hydrogen gas is not evolved when a metal reacts with nitric acid.

Reason Nitric acid is a strong oxidising agent.

6. Assertion Gold occurs in native state.

Reason Gold is a reactive metal.

7. Assertion On reacting with water, calcium starts floating over water.

Reason Calcium reacts with cold water at room temperature.

8 . Assertion Metals generally have very high melting and boiling points

Reason Metals have the strongest chemical bonds which are metallic in nature.

9. Assertion Zinc can easily displace copper on reacting with a solution of Copper sulphate.

Reason Copper is more reactive metal as compared to Zinc.

10 Assertion The oxides of sulphur and phosphorus are acidic in nature.

Reason Metal oxides are basic in nature.

11. Assertion Electrovalency of Na is +1.

Reason The number of electrons which an atom either loses or gains in the formation of an ionic bond is known as its valency.

12. Assertion Non-metals are electronegative in nature.

Reason They have tendency to lose electrons.

13. Assertion Magnesium does not react with oxygen upon heating.

Reason Magnesium is a metallic element.

SECTION C

CASE STUDY BASED QUESTIONS

I. Anodising is the process of forming a thick oxide layer of aluminium. This aluminium oxide coat makes it resistant to further corrosion. The process is done by immersing the clean aluminium article as anode into dilute sulphuric acid electrolyte and passing an electric current through the medium. The aluminium part to be coated becomes anode so that oxygen ions are released from the electrolyte to combine with the aluminium atoms at the surface of the part anodised. Anodising is a process to increase the oxide layer's thickness on the surface of metal parts. This process converts the metal surface into a decorative, durable, corrosion-resistant, anodic oxide finish. It has many uses like -Protect satellites from the harsh environment of space.

1. Anodising is.....

A. A zinc diffusion process

B. An oxidising process used for aluminium and its alloys.

C. A process used for making thin phosphate coating on steel .

D. Is the process of coating of zinc .

2 The nature of electrolytic solution used is

A acidic
B basic
C. neutral
D. none of the above

3. Which of the following metals is involved in the anodisation process?

A) Cu
B) Au
C) Pt
D) Al

4. Which common application do anodizing and galvanizing serve?

A) Corrosion resistance
B) Improved surface
C) Zinc coating
D) Increased strength

II On the basis of reactivity of different metals with oxygen, water and acids as well as displacement reactions, the metals have been arranged in the decreasing order of their reactivities. This arrangement is known as activity series or reactivity series of metals. The basis of reactivity is the tendency of metals to lose electrons. If a metal can lose electrons easily to form positive ions, it will react readily with other substances. Therefore, it will be a reactive metal. On the other hand, if a metal loses electrons less rapidly to form a positive ion, it will react slowly with other substances. Therefore, such a metal will be less reactive The activity series of metals is shown in the box. Study this table carefully and answer the questions.

Activity Series
K
Na
Ca
Mg
Al
Zn
Fe
Pb
H
Cu
Ag
Au

5.Which of the metal is most reactive?

A Al
B. Mg
C. Na
D . K

6.What happens when Zn is added to CuSO4 solution? Give reason.

(i) Blue colour changes to green
(ii) Blue colour remains same
(iii) Blue colour turns colourless
(iv) Zinc displaces copper from Copper Sulphate solution

A i and iv
B ii and iv
C iii and iv
D i only

7.Can we store CuSO4 in silver container? Give reasons.

A NO,Silver sulphate is formed
B YES,No reaction occurs
C No,Copper is displaced by silver
D None of the above

8. Which of the following metals can not displace hydrogen while reacting with HCl ?
A Copper
B Zinc
C Magnesium
D Sodium

9. Which of the following metals reacts vigorously with oxygen?
A Zinc
B Magnesium
C Sodium
D Copper

10. Which of the following represents the correct order of reactivity for the given metals?
A Na > Mg > Al > Cu
B Mg > Na > Al > CuC
Na > Mg > Cu > Al D
Mg > Al > Na > Cu

ANSWER KEY- MCQ

Q no	Ans	Q no	Ans	Q no	Ans	Q no	Ans	Q no	Ans
1	b	2	A	3	b	4	c	5	a
6	c	7	B	8	c	9	c	10	d
11	c	12	B	13	c	14	a	15	d
16	b	17	D	18	d	19	c	20	b
21	d	22	A	23	a	24	c	25	d
26	c	27	C	28	b	29	b	30	c
31	a	32	A	33	b	34	d	35	b
36	c	37	B	38	c	39	a	40	c
41	d	42	A	43	b	44	a	45	d
2246	a	47	C	48	b	49	b	50	c

ANSWER KEY- ASSERTION REASON TYPE QUESTIONS

Q no	Ans	Q no	Ans	Q no	Ans	Q no	Ans	Q no	Ans
1	A	2	A	3	B	4	C	5	A
6	C	7	B	8	A	9	C	10	B
11	A	12	C	13	D				

ANSWER KEY- CASE STUDY QUESTIONS

Q no	Ans	Q no	Ans	Q no	Ans	Q no	Ans	Q no	Ans
1	B	2	A	3	D	4	C	5	D
6	C	7	B	8	A	9	C	10	A

****7Ans. c The blue colour solution will change to colourless and reddish brown copper metal will deposited because Zinc is more reactive than Cu.

$Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$

****

CHAPTER 6. LIFE PROCESSES

NUTRITION

FOCUS AREA

1. Molecular movement --The criteria for deciding whether something is living or not.

2. Viruses do not show any molecular movement in them until they infect some cell, so there is controversy whether viruses are living or nonliving.

3. Molecular movement is necessary in Living creatures to keep repairing and maintaining their structures which are made up of molecules.

4. Life processes—Various processes in living organisms like nutrition, respiration, transport of materials, excretion etc. which are required for maintenance of life.

5. Nutrition—The process of taking in of food and its utilization by the body.

6. Food – Source of energy for living organisms.

7. Respiration—The process of breaking down of food by living organisms to release energy.

8. Modes of nutrition –1. autotrophic nutrition 2. Heterotrophic nutrition

9. Autotrophic nutrition-The process by which organisms synthesis their own food.

10. Autotrophs—Organisms, which synthesis their own food.eg: green plants, some bacteria like sulphur bacteria etc.

11. Heterotrophic nutrition—The process by which organisms obtain food from other organisms.

12. Heterotrophs—Organisms which depend on other organisms for food.

13. Photosynthesis—The process by which green plants synthesis their own food using water and carbon dioxide in presence pf sunlight with the help of chlorophyll.

$$6CO_2 + 12\ H_2O \longrightarrow C_6H_{12}O_6 + 6CO_2 + 6H_2O$$

14. Raw materials for photosynthesis –carbon di oxide and water

15. Steps in photosynthesis:

(i) Absorption of light energy by chlorophyll.

(ii) Conversion of light energy to chemical energy and splitting of water

molecules into hydrogen and oxygen.

(iii) Reduction of carbon dioxide to carbohydrates.

16.Stomata—Tiny openings present on the surface of leaves.

17. Function of stomata:1. transpiration ,2. exchange of gases

18.Opening and closing of stomata is controlled by the water content present in guard cells. When water flows into the guard cells, they swell up, stomata open. When guard cell loses water, it shrinks and stomata closes.

18. Modes of heterotrophic nutrition—Holozoic, Saprozoic and Parasitic nutrition

19. Holozoic nutrition—Mode of nutrition in which organism takes in food(ingestion) followed by digestion, absorption, assimilation and egestion. Eg: human beings, birds, insects, amoeba, paramecium etc.

20. Saprozoic nutrition---Mode of nutrition in which organisms draw nutrition from dead and decomposing organic matter. They break-down the food material outside the body and then absorb it. Eg: bacteria and fungi.

21. Parasitic nutrition—Mode of nutrition in which an organism lives in or on other living organism drawing nutrition from it. A parasite depends on host. Parasite is benefitted and host is harmed.eg: Cuscuta (amar-bel), ticks, lice, leeches, tape-worms, disease causing microorganisms etc.

22. Mode of nutrition:

In *Amoeba* Holozoic nutrition. Done by phagocytosis—taking in of solid materials by a cell.

In *Paramoecium* --- the cell has a definite shape and food is taken in at a specific spot. Food is moved to this spot by the movement of cilia which cover the entire surface of the cell.

23.Digestive enzymes: Enzymes which help in digestion. Enzymes are bio catalysts.

25. Digestive glands and their secretion:

SL NO	DIGESTIVE GLAND	SECRETION	ENZYME RELEASED	ROLE/FUNCTION
1	Salivary gland	saliva	Salivary amylase (ptyalin)	Converts starch to maltose

2	Gastric gland	gastric juice	pepsin	Digestion of protein
3	Liver	bile	No enzyme	Emulsification of fat (conversion of complex fat into tiny droplets)
4	Pancreas	Pancreatic juice	Trypsin Pancreatic - amylase Pancreatic lipase	Digests protein Digestion of carbohydrate Digests fat
5	Intestinal gland	Intestinal juice	Protease Amylase Lipase	Digests protein Digests carbohydrate Digests fat

Digested food is absorbed by villi present on the inner wall of small intestine. Water is absorbed by large intestine.

SECTION A

MULTIPLE CHOICE QUESTIONS --- NUTRITION

Q1. The secretion of which of the given glands do not contain any digestive enzyme?

a) Salivary gland

b) Gastric gland

c) Liver

d) Intestinal gland

Q2. Which of the following statement is false ?

a) Massive amounts of gaseous exchange take place in the leaves through stomata

b) Exchange of gases occurs across the surface of stems, roots and leaves of plants.

c) Oxygen released by the plants during photosynthesis comes from water absorbed by the plants.

d) Stomata are always kept open during day time and closed during night time.

Q3. Photosynthesis is an important process for life on earth because

i) It is the primary source of food for life on earth

ii) It releases oxygen and help balance oxygen cycle

iii) It is the only natural process to trap energy present in sunlight to circulate in the living

a) i) and ii) are correct statement

b) i) and iii) are correct statement

c) i), ii) and iii) are correct statement

d) ii and iii) are correct statement

Q4. To release energy for various chemical reactions, our body use

a) Nitrogen and carbon

b) Oxygen

c) Carbon sources and oxygen

d) None of the above

Q5) Parasitic mode of nutrition is found in

a) All bacteria and fungi

b) Cuscuta, tapeworm, leech, ticks

c) leech and mosquito, lice

d) Fungus only

Q6) The form of nutrition differs depending on

a) the type of food material

b) availability of food material

b) how food material is obtained by the organism

c) all of the above

Q7) Paramoecium captures its food with the help of

a) pseudopodia

b) cilia

c) flagella

d) tentacle

Q8) Choose the wrong statement regarding gastric juice

a) It contains a fat digesting enzyme called pepsin

b) Pepsin is activated by hydrochloric acid released by gastric gland

c) Mucus present in gastric juice protects the wall of the stomach from hydrochloric acid.

d) Gastric juice kills bacteria present in food.

Q9) The role of anal sphincter is

a) to control peristaltic movement

b) exit of undigested food

c) absorption of water

d) to complete digestion

Q10) Mark the wrong statement regarding villi:

Villi are specialized for absorption in the small intestine because they have

a) thin wall which enables a shorter absorption path

b) larger surface area for more efficient absorption

c) Richly supplied with blood vessels for better absorption

d) Thick wall which squeezes food for absorption of nutrients

11) The process of digestion starts from -------and completed in ---------- respectively

a) mouth, anus

b) stomach, anus

c) stomach, small intestine

d) mouth, small intestine

12. Large globules of fat in small intestine is broken down to smaller globules is done by

a) lipase

b) protease

c) bile salts

d) bile pigments

13. The function of gall bladder is to

a) produce enzymes

b) secrete bile

c) digestion of food

d) store of bile

14. Food is taken through the entire body surface in

a) Amoeba

b) spider

c) fish

d) human beings

15. To test the presence of starch on leaf, the leaf is boiled in alcohol within a water bath to

a) de starch the leaf

b) de colourise the leaf

c) to kill the cells

d) dehydration of leaf

SECTION B ---

ASSERTION REASON TYPE QUESTIONS

Answer these questions selecting the appropriate option given below:

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true and R is not the correct explanation of A

(c) A is true but R is false

(d) A is False but R is true

Q1**. Assertion (A):**During photosynthesis glucose is formed , but it is stored in the form of starch.

Reason (R): During photosynthesis reduction of carbon dioxide to carbohydrates takes place.

Q2. **Assertion (A):** In bell jar experiment to demonstrate the role of Carbon dioxide in photosynthesis KOH is used.

Reason (R): KOH removes carbon dioxide to create a carbon dioxide free environment for the experiment.

Q3. **Assertion (A): The** food moves in a regulated manner along the digestive tube.

Reason (R): The lining of digestive tube has muscles that contract rhythmically in order to push the food forward.

Q4. **Assertion (A): Carnivores** like tigers have a shorter small intestine compared to herbivores eating Grass.

Reason (R): Meat is not easy to digest when compared to cellulose

Q5. **Assertion (A): The** plaque formation around the teeth leads to tooth decay.

Reason (R): Saliva cannot reach the tooth surface to neutralise the acid as plaque covers the teeth.

Q6. **Assertion(A):** Fats in the intestine is emulsified by bile juice before the action of lipase on them.

Reason (R): Fats are present in the intestine as large globules which makes it difficult for lipase to act on them directly.

Q7. **Assertion (A):** In multi cellular organisms, simple diffusion will not meet the requirement of all the cells in exchange of materials

Reason (R): All the cells may not be in direct contact with the surrounding environment.

Q8. **Assertion (A): Desert** plants take up carbon dioxide at night and prepare an intermediate product.

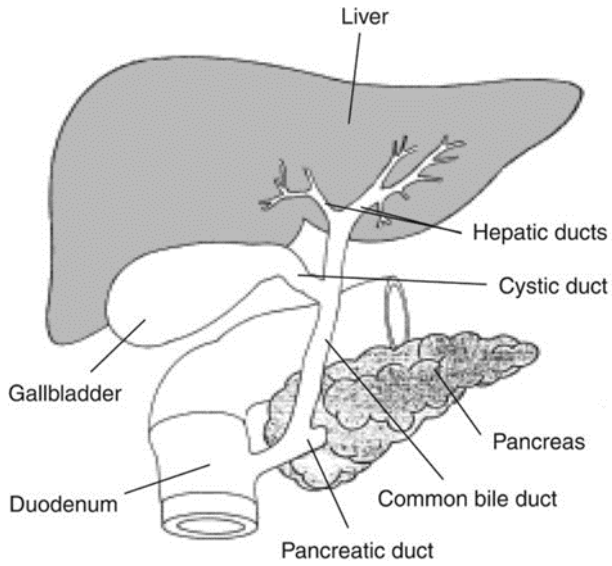
Reason (R): In desert plants, Reduction of carbon di oxide to carbohydrate takes place takes place at night.

Q9. **Assertion(A):** Rate of breathing in aquatic organisms is much slower than that seen in terrestrial organisms.

Reason (R): The amount of dissolved oxygen is fairly low, compared to oxygen in air.

SECTION C ---CASE STUDY 1

The liver is a reddish-brown, wedge-shaped organ with two lobes of unequal size and shape. It is both the heaviest internal organ and the largest gland in the human body. The liver is thought to be responsible for up to 500 separate functions, usually in combination with other systems and organs. Liver plays a very important role in digestion of food. The pancreas is an organ of the digestive system and endocrine system of vertebrates. The pancreas plays a vital role in the digestive system. It does this by secreting a fluid that contains digestive enzymes into the duodenum, the first part of the small intestine, that receives food from the stomach. These enzymes help to break down carbohydrates, proteins and lipids



ANSWER THE FOLLOWING QUESTIONS:

(i) The acidic food coming from the stomach is made alkaline for the pancreatic enzymes to act. This is done by

a) pancreatic amylase

b) secretion from intestinal wall

c) mixing the food with bile

d)pancreatic juice

(ii) The longest part of alimentary canal is

a) large intestine

b) oesophagus

c) small intestine

d)duodenum

(iii) Pancreatic juice contains a protein digesting enzyme

a) pepsin

b) trypsin

c) renin

d) pancreatic amylase

(iv) The bile duct from liver and duct from pancreas joins together and opens at ----------part of small intestine

a) ilium

b) jejunum

c) duodenum

d) middle

(v) The composition of bile is

a) bile pigments and enzymes

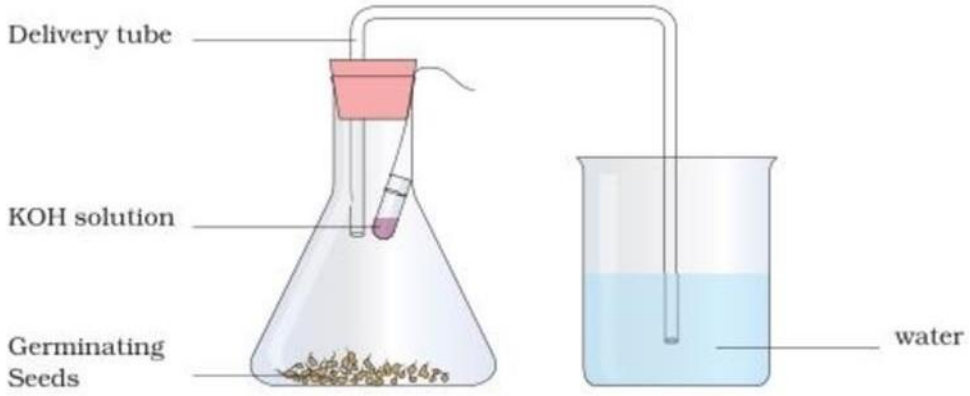
b) bile salts and hydrochloric acid

c)bile salts and bile piments

d)bile salts and mucus

CASE STUDY 2

A student placed a few germinating bean seeds in a conical flask. Poured 4ml of potassium hydroxide (KOH) solution into a small test tube. Tied a cotton thread around the neck of the test tube. Suspended the test tube in the conical flask above the germinating seeds. Closed the mouth of the conical flask with a cork and applied some Vaseline around connections. The apparatus is kept undisturbed for a few hours.



i) What is the role of KOH in the above arrangement?

a) Absorb carbon dioxide produced by the seeds.

b) Release oxygen for the seeds

c) Absorb oxygen present in the flask.

d) Provides moisture for the seeds

ii) After a few hours, the water enters into the delivery tube from beaker due to

a) germinating seeds absorb water

b) partial vacuum created inside the flask

c) evaporation of water in the beaker

d) KOH solution in the flask releases moisture

iii) Why Vaseline is applied around the connections?

a) To make the connections air tight

b) For lubrication of the contact area of cork and conical flask

c)To retain moisture

d)To prevent bacterial infection

iv) Identify the INCORRECT statement .

a) germinating seeds use up carbon di oxide for photosynthesis

b) carbon dioxide is released by the seeds when they respire

c)KOH solution absorbs the carbondioxide released by the seeds.

d)germinating seeds take up oxygen present inside the flask.

ANSWERKEY

SECTION A [MCQ]

1) c) Liver
2) d). Stomata are always kept open during day time and closed during night time.
3) c) i), ii) and iii) are correct statement
4) c) Carbon sources and oxygen
5) b) Cuscuta, tapeworm, leech
6) c) all of the above
7) b) cilia
8) a) It contains a fat digesting enzyme called pepsin
9) b) exit of undigested food
10) d) thick wall which squeezes food for absorption of nutrients
11) d) mouth, small intestine
12) c) bile salts
13) d) storage of bile
14) a) *Amoeba*
15) b) de colourise the leaf

SECTION B - ASSERTION REASON

1) a)

2) a)

3) a)

4) c)

5) a)

6) a)

7) a)

8) c)

9) d)

SECTION C --- ANSWERS CASE STUDY

1.(i) c) bile

(ii) c) small intestine

(iii) b) trypsin

(iv) c) duodenum

(v) c) bile salts and bile piments

2. (i) a) Absorb carbon dioxide produced by the seeds.

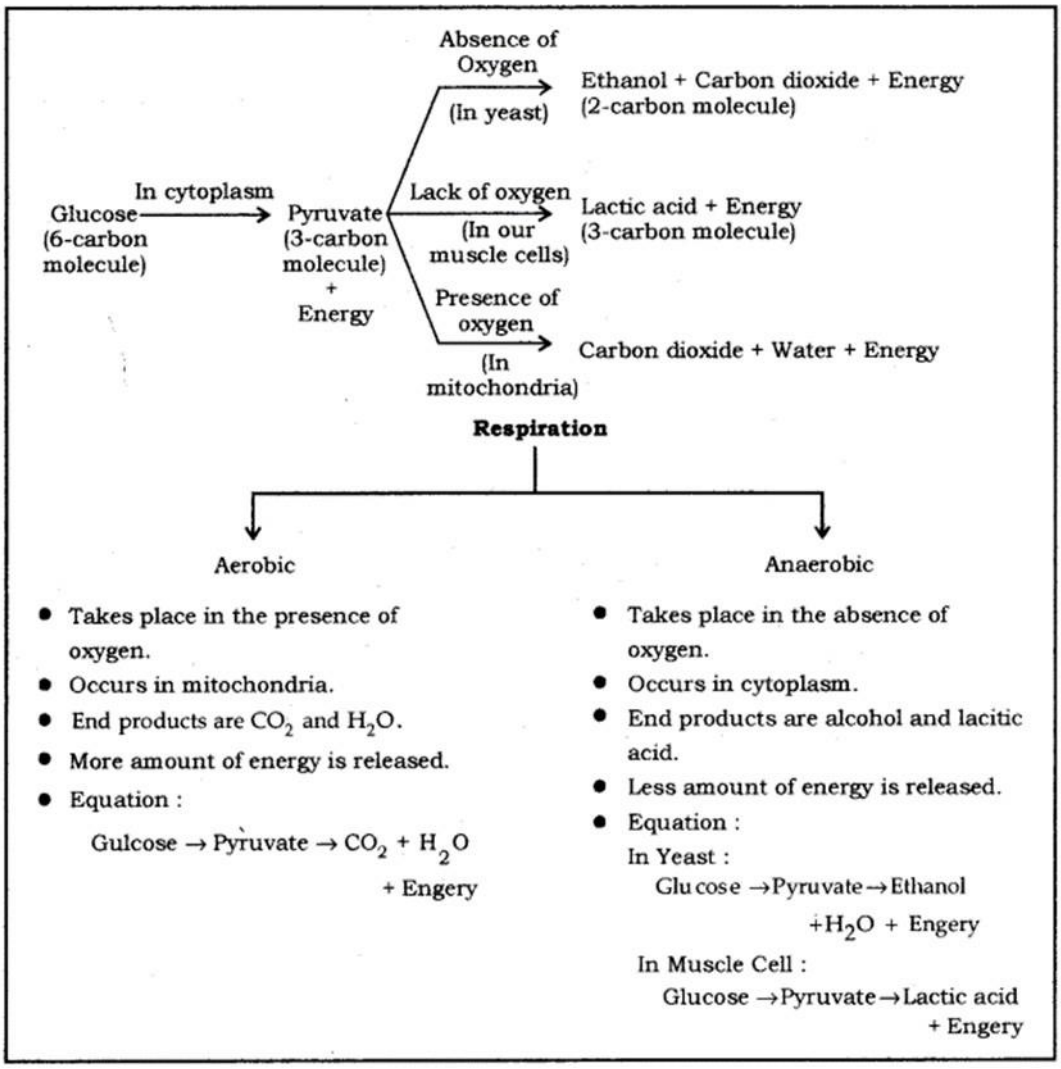
(ii) b) partial vacuum created inside the flask

(iii) a) To make the connections air tight

(iv) a) germinating seeds use up carbon di oxide for photosynthesis

RESPIRATION

FOCUS AREA



SECTION A ---MULTIPLE CHOICE QUESTIONS

1) Breaking down of pyruvate using oxygen takes place in the

(a) Cytoplasm

(b) Mitochondria

(c) Golgi bodies

(d) Endoplasmic reticulum

2) The respiratory route of air in the respiratory tract of human (outside to inside) is:

(a) nostrils " pharynx " larynx "trachea " alveoli.

(b) alveoli " pharynx " larynx " trachea" nostrils.

(c) alveoli " larynx " trachea " pharynx" nostrils.

(d) nostrils " trachea " pharynx "larynx " alveoli.

3)_____is the raw material required by a living cell to initiate respiration?

(a) Glucose

(b) Glucose + O2

(c) O2

(d) Glucose + ATP

4) Study the table below and select the row that has the correct Information.

	Break down of pyruvate in	**Take place in**	**End products**
(a)	Absence of oxygen	Yeast	Lactic acid + Energy
(b)	Lack of oxygen	Muscle cells	Ethanol + CO_2 + Energy
(c)	Presence of oxygen	Mitochondria	CO_2 + H_2O + Energy
(d)	Presence of oxygen	Mitochondria	Ethanol + CO_2 + Energy

5) The correct sequence of anaerobic respiration in yeast is:

a) Glucose → Pyruvate → Lactic acid

b) Glucose → Pyruvate → Carbon dioxide + Ethanol

c) Glucose → Pyruvate → ADP→ Lactic acid

d) Glucose → Pyruvate → carbon dioxide + Ethanol + Energy

6) Sometimes we get painful cramps in our leg muscles after running for a long time due to accumulation of:

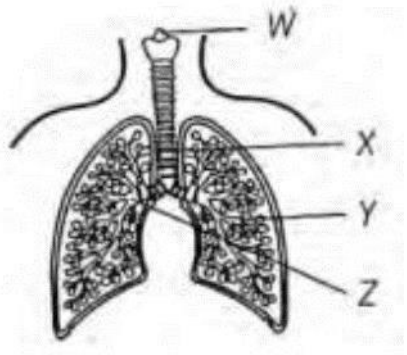
a) Hydrochloric acid

b) Fat

c) Carbon dioxide

d) Lactic acid

7. The diagram shows part of the human gas exchange system



What is W, X, Y and Z?

	Bronchus	Bronchiole	Larynx	Trachea
a)	W	X	Z	Y
b)	X	Z	Y	W
c)	Y	W	X	Z
d)	Z	Y	W	X

8) When air is blown through lime water it turns milky because of the presence of _____ in exhaled air.

a) water

b) carbon dioxide

c) limestone

d) calcium oxide

SECTION B ----ASSERTION REASON TYPE QUESTIONS

1. **Assertion:** Ethanol is obtained during the anaerobic respiration.

Reason: This is due to presence of oxygen and it takes place in the mitochondria.

(a) Both Assertion and Reason are true and Reason is the correct explanation

of Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Both Assertion and Reason are false.

2. **Assertion:** Aerobic animals are not truly aerobic.

Reason: Anaerobically they produce lactic acid.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Both Assertion and Reason are false

SECTION A --- ANSWERS

1.(b) Mitochondria

2.(a) nostrils " pharynx " larynx "trachea " alveoli

3.(a) Glucose

4 (c)

5.d) Glucose → Pyruvate → carbon dioxide + Ethanol + Energy

6.d) Lactic acid

7.(d)

8.b) carbon dioxide

SECTION B-- ANSWERS ASSERTION REASON

1. (c) Assertion is true but Reason is false

2.(a)Both Assertion and Reason are true and Reason is the correct explanation of Assertion

TRANSPORTATION

FOCUS AREA

1. Transport of materials is done by circulatory system.

2. Circulatory system consists of heart, blood vessels and blood.

3. Heart-pumps blood.

4. Four chambers of heart -right and left atria & right and left ventricles.

5. Chambers of right and left are separated by auriculo ventricular septum.

6. Heart has tricuspid, bicuspid and semilunar valves to ensure blood flow in only one direction.

7. Blood vessels—arteries, veins and capillaries.

8. Arteries carry oxygenated blood away from heart to various parts of the body.

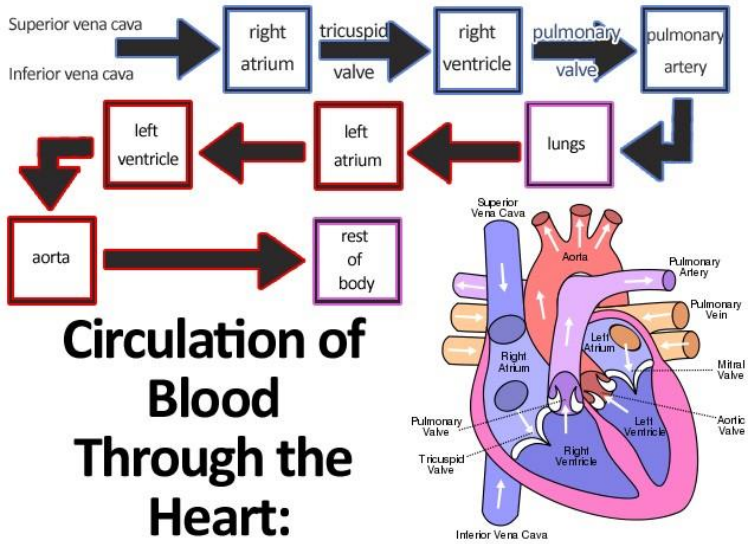
have thick walls, blood flows with high pressure, no valves.

9. Veins carry deoxygenated blood from various parts of the body to heart. Have thin walls , blood flows with lower pressure ,have valves to prevent backward flow of blood.

10. Capillaries have very thin walls for exchange of materials between blood and tissues.

11. Lymph-tissue fluid. Helps in defence of the body and transport of materials like digested fat

12. Direction of blood flow in heart:



13. Amphibians and reptiles have three chambered heart. They do not maintain a constant body temperature. The body temperature changes with the environment. Their energy need

is comparatively less, and can tolerate the mixing up of oxygenated and deoxygenated blood in the heart.

14. Fishes have two chambered heart. Blood is pumped to gills, gets oxygenated and then passes directly to the rest of the body.

15. In birds and mammals, blood passes twice through the chambers of the heart before being circulated to the rest of the body. This is double circulation.

TRANSPORTATION IN PLANTS:

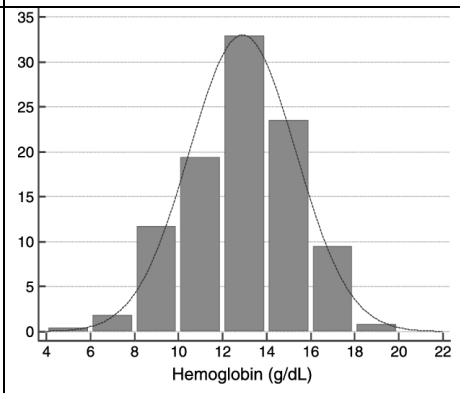
Substances to be transported: water, minerals, synthesised food etc.

Tissues for transport: Vascular tissues—xylem and phloem.

Transpiration creates a suction This pulls water from the xylem of roots. Thus, transpiration helps in the upward movement of water and minerals from roots to leaves. Transpiration also helps in temperature regulation.

Translocation: Food prepared by leaves moves to other parts of the body like roots, stem, fruits etc through phloem. This is called translocation. Translocation in phloem is achieved by using energy from ATP.

SECTION A - MULTIPLE CHOICE QUESTIONS

1	 Haemoglobin is the iron containing respiratory pigment which transports oxygen. Study the histogram, human age vs haemoglobin content . and answer the following. Which of the following statement is not true? a. Children have less haemoglobin content than adults b. Human adults have more haemoglobin content than children c. Humans have high haemoglobin content during youth d. During adolescence individuals have highest haemoglobin content	
2	Blood consists of fluid medium called	

a. Serum
b. Plasma
c. Pus
d. None of these

3 Which of the following is not a function of blood?
a. Transportation of digested nutrients
b. Transportation of carbon dioxide, oxygen
c. Transportation of nitrogenous wastes
d. Transport of impulses

4 Human heart is made of
a. Only bones and muscles
b. Only cartilages and bones
c. Only bones and cartilages
d. Only cardiac muscles

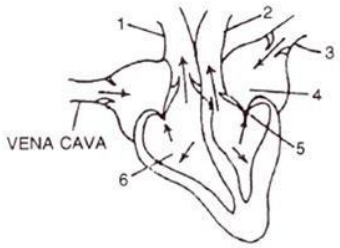
5

M/F	Low normal range	High normal range	Acceptable for donating
Males	13.5 g/dL	17.5g/dL	13.0g/dL
Females	12.0g/dL	15.5g/gL	12.5g/dL

Blood donation can save the life of many people.

Name	Sex	Haemoglobin level
Arun	M	11.3g/dL
Arjun M	10.8 g/dL	Geetha
F 13.5 g/dL	Rama F	9.5
g/dL		

Out of the four persons in the above list, who is fit for donating blood
a. Arun
b. Arjun
c. Geetha
d. Rama

6 

Study the diagram of human heart, in which certain parts are labelled 1 to 6.
Find the wrong statement
a. Blood in the part 3 is oxygenated and coming from lungs

	b. When part 6 contracts deoxygenated blood enters part 1 and goes to Lungs c. When part 5 contracts oxygenated blood enters part 2 and goes to all parts of the body d. Part 6 and part 5 are interconnected and carry oxygenated blood and deoxygenated blood respectively	
7	The following are the events during circulation of blood in human heart, in the left side of heart. i) Atrium contracts, and, the left ventricle receives the blood. ii) Oxygen-rich blood from the lungs comes to the left atrium. iii) When the muscular left ventricle contracts in its turn, the blood is pumped out to the body. iv) The left atrium relaxes. Arrange the events in the correct sequence a. i,ii,iii,iv b. iv,ii,i,iii c. iv,iii,ii,i d. iv,iii,I,ii	
8	Circulation of deoxygenated through heart is taking place in a systematic manner. Following are the major steps , but not in the correct sequential order. Arrange the events in the correct order . i) The blood is transferred to the right ventricle, ii) Ventricle contract, which in turn pumps it to the lungs for oxygenation. iii) De-oxygenated blood comes from the body to the right atrium, as it relaxes. iv) As the right atrium contracts, the right ventricle receives blood a. i,ii,iii.iv b. iv,iii,ii,i c. iii,iv,i,ii d. ii,i,iv,iii	
9	Fishes have ---------- chambered heart a. Four chambered heart b. Three chambered heart c. Two chambered heart d. Single chambered heart	

10 Characteristics of blood vessels are tabulated in the table, but some entries are not correct. Study and find out the correct statement

Structure	Veins	Arteries	Capillaries
Width of wall	Thick	Thin	Single layer of cells
Size of lumen	large	small	Very small
Valves	yes	No	Yes

a. Arteries have thick wall whereas veins have thin wall
b. Valves are present in veins and absent in arteries and capillaries
c. Both a & b
d. None of these

11 Blood cells which are responsible for blood clotting are
a. erythrocytes
b. leucocytes
c. thrombocytes
d. none of these

12 Following are the major events in blood clotting, but not in the correct order

i) Fibrin get entangled with blood cells and forms clot
ii) Thromboplastin converts prothrombin to thrombin
iii) Platelets release thromboplastin when exposed to air
iv) Thrombin converts fibrinogen to fibrin

. Find the correct sequential order of these events.
a. iii,ii,iv,i
b. i,ii,iii,iv
c. ii,i,iv,iii
d. I,iii,ii,iv

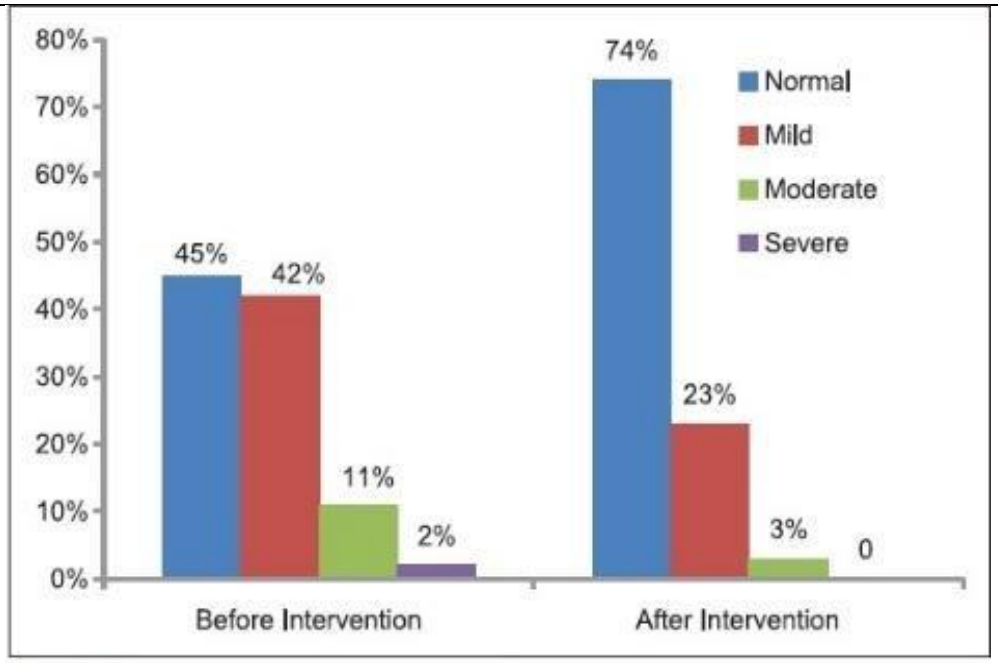
13 The force that blood exerts against the wall of a vessel is called blood pressure. The pressure of blood inside the artery during ventricular systole (contraction) is called systolic pressure and pressure in artery during ventricular diastole (relaxation) is called diastolic pressure. The correct representation of systolic and diastolic pressure is

a. The normal systolic pressure is about 80 mm of Hg and diastolic pressure is 120 mm of Hg.
b. The normal systolic pressure is about 150 mm of Hg and diastolic pressure is 100 mm of Hg.
c. The normal systolic pressure is about 100 mm of Hg and diastolic pressure is 150 mm of Hg.

	d. The normal systolic pressure is about 120 mm of Hg and diastolic pressure is 80 mm of Hg.	
14	Which of the following statement is not correct about LYMPH? a. Lymph or tissue fluid, helps in transportation and is similar to the blood plasma but colourless and contains less protein. b. Through the pores present in the walls of capillaries some amount of plasma, proteins and blood cells escape into intercellular spaces in the tissues to form the tissue fluid or lymph. c. Lymph drains into lymphatic capillaries from the intercellular spaces, which join to form large lymph vessels that finally open into larger veins. d. Lymph is always present in closed vessels like blood .	
15	Plants use relatively slow transport systems, the reason is a. Plants do not move, and b. plant bodies have a large proportion of dead cells in many tissues c. plants have low energy needs d. all the three	
16	Two pathways are operated in plants as independently organised conducting tubes. The statement which is not applicable in case of plant vascular system is a. the xylem moves water and minerals obtained from the soil. b. The phloem transports products of photosynthesis from the leaves where they are synthesised to other parts of the plant c. Xylem is carrying water from roots to leaves d. Phloem can carry both water and products of photosynthesis	
17	The loss of water in the form of vapour from the aerial parts of the plant is known as a. transpiration. b. Translocation c. Guttation d. None of these	
18	Transpiration is a necessary evil, because a. Evaporation of water molecules, during transpiration , from the cells of a leaf creates a suction which pulls water from the xylem cells of roots. b. Transpiration helps in the absorption and upward movement of water and minerals dissolved in it from roots to the leaves	

	c. During the day when the stomata are open, the transpiration pull becomes the major driving force in the movement of water in the xylem. d. All of these	
19	The transport of soluble products of photosynthesis are moved from leaves, where they are formed, to other parts of the plant by a. Translocation b. Transpiration c. Guttation d. None of these	
20	Translocation takes place with the help of a. Only companion cells b. Phloem and companion cells c. Only xylem d. Both xylem and phloem	
21	Which of the following statement is correct statement? a. Transport of water in plants takes place upward and downward directions. b. The translocation of food and other substances takes place both in upward and downward directions. c. Transport of food takes place in upward direction only d. Transport of food takes place in downward direction only	
	SECTION --B ASSERTION REASON TYPE QUESTIONS The following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true and R is not the correct explanation of A C. A is true but R is false D. A is False but R is true	
22	**Assertion**: - Warm blooded animals, such as birds and mammals, have high energy needs and constantly use energy to maintain their body temperature **Reason**: - The separation of the right side and the left side of the heart in these organisms is useful to keep oxygenated and deoxygenated blood from mixing which allows a highly efficient supply of oxygen to the body of organisms	

23	**Assertion**: -In Amphibians and reptiles are animals, the body temperature depends on the temperature in the environment and are called cold blooded animals **Reason**: - Such animals, have three-chambered hearts, and tolerate some mixing of the oxygenated and de-oxygenated blood streams.
24	**Assertion**: A proper system of transportation is essential in plants **Reason**: - If the distances between soil-contacting organs and chlorophyll containing organs in plants become large, diffusion processes will not be sufficient to provide raw material in leaves and energy in roots.
25	**Assertion**: Human heart is located in the centre of the thorax, with an orientation towards left **Reason**:- Dextrocardia is a condition in which the heart is pointed towards the right side of the chest.
26	**Assertion**: Transpiration is a necessary evil. **Reason**:- Transpiration creates suction pull, which in turn cause ascent of sap, causes lose of water from plant tissues
	SECTION C -----CASE STUDY BASED QUESTIONS **Anaemia** Human blood contains a red pigment called haemoglobin, which is rich in iron. It carries oxygen to different parts of body. Deficiency of iron in diet leads to decreased amount of haemoglobin, making the blood thin and less red in colour which leads to less supply of oxygen to different parts of the body; this state is known as anaemia. (Source: Technical Handbook on Anaemia in Adolescents WEEKLY IRON AND FOLIC ACID SUPPLEMENTATION PROGRAMME) Answer Q.No.27 to 29
27	The respiratory pigment haemoglobin is present in a. erythrocytes b. leucocytes c. thrombocytes d. none of these

28	 Graph 3: Reduction in severity of anemia after intervention Study the graph and answer. Which of the following statement is not correct? a. Severely affected anaemia cases can be effectively reduced by early intervention b. Anaemia cases increased after intervention c. Mild anaemia cases decreased 42% to 23% after intervention d. Moderate anaemia cases decreased from 11% to 3% after intervention
29	Which of the following food item will not support adolescents to improve haemoglobin level in blood? a. Leafy vegetables like spinach, onion, methi leaves b. Fruits like amla, apple, guava, jamun c. Pulses like soy bean, Bengal gram, lentil d. Junk food and soft drinks

ANSWERS

Q.No	Correct option
1	D
2	B
3	D
4	D
5	C
6	D
7	B
8	C

9	C
10	C
11	C
12	A
13	D
14	D
15	D
16	D
17	A
18	D
19	A
20	D
21	B
22	A
23	A
24	A
25	B
26	A
27	A
28	B
29	D

EXCRETION

FOCUS AREA

Excretion is the removal of harmful and unwanted metabolic wastes from the body. Osmoregulation is the regulation of osmotic pressure of body fluids by regulating the amount of water and salts in the body

Excretory system of human beings includes:

- A pair of kidneys.
- A urinary bladder.
- A pair of the ureter.
- A urethra.

NEPHRON:

It is composed of a tangled mess of tubes and a filtering part, called glomerulus.

The glomerulus is a network of blood capillaries to which renal artery is attached.

The glomerulus is enclosed in a capsule like portion, called Bowman's capsule. The Bowman's capsule extends into a fine tube which is highly coiled.

URINE FORMATION IN KIDNEY:

Urine formation involves following steps:

1. Filtration: Water and dissolved substances such as urea, uric acid, glucose, amino acids, some vitamins and inorganic salts are filtered from the blood flowing under pressure in glomerular capillaries and form glomerular filtrate.

2. Reabsorption: Useful substances (glucose, all amino acids, some inorganic salts and most water) are re absorbed from glomerular filtrate

into the blood.

3. Tubular Secretion: The excretory products which are harmful to our body like potassium, ammonia and hydrogen ions are secreted from the blood into the glomerular filtrate by diffusion.

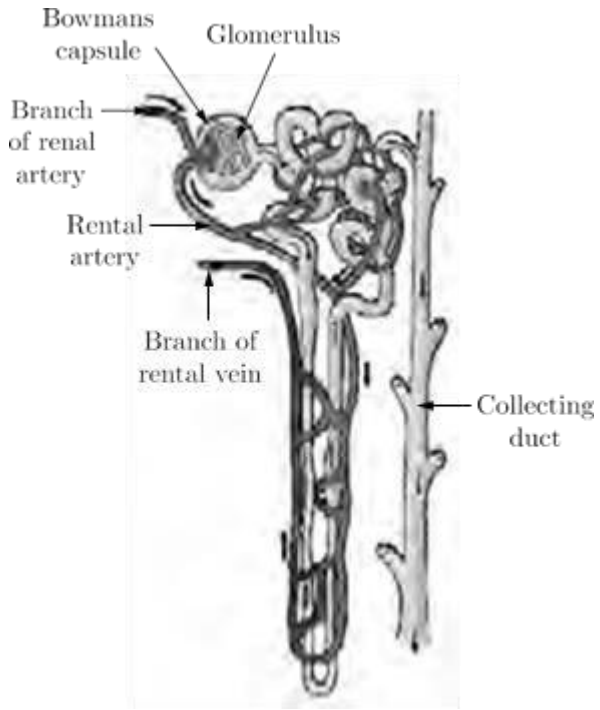
Urine is collected in the urinary bladder. It is released periodically to the exterior through urethra.

Excretion in Plants:

Waste products in plants are tannins, resins, gums, alkaloids, essential oils, salt crystal, etc

SECTION A ----- MULTIPLE CHOICE QUESTIONS

1. The given diagram is the structure of a/an-



(a) Alimentary canal

(b) Respiratory tract

(c) Nephron

(d) Small intestine

2. Kidney helps in ----------

(a) Regulating blood volume

(b) Controlling B.P

(c) Controlling pH

(d) All

3. The biological process involved in the removal of harmful metabolic wastes from the body is called

(a) Photosynthesis

(b) Respiration

(c) Excretion

(d)Translocation

4. An artificial kidney is a device to remove nitrogenous waste products from the blood through-

(a) Diaphragm

(b) Dialysis

(c) ECG

(d) Electrolysis

5. If a person undergoes prolonged fasting then his urine will have higher content

(a) Ketones

(b) Amino acids

(c) Fats

(d) Glucose

6. Normally, in a healthy adult, the initial filtrate in the kidneys is about:

(a) 100 L/day

(b) 150 L/day

(c) 180 L/day

(d) 200 L/day

7. Conversion of excess of amino acids into urea is done in?

(a) Lungs

(b) Large intestine

(c) Liver

(d) Cloaca

8. What happens if a person has one kidney removed?

(a) They will accumulate excess urea

(b) They will die

(c) They will continue as normal

(d) They will stop making urine

9. The_____is a network of tiny blood vessels located at the beginning of a nephron.

(a) Renal calyces

(b) Renal pyramid

(c)Bowman’s capsule

(d)Glomerulus

10_____is responsible for the reabsorption of water and sodium chloride from the urine.

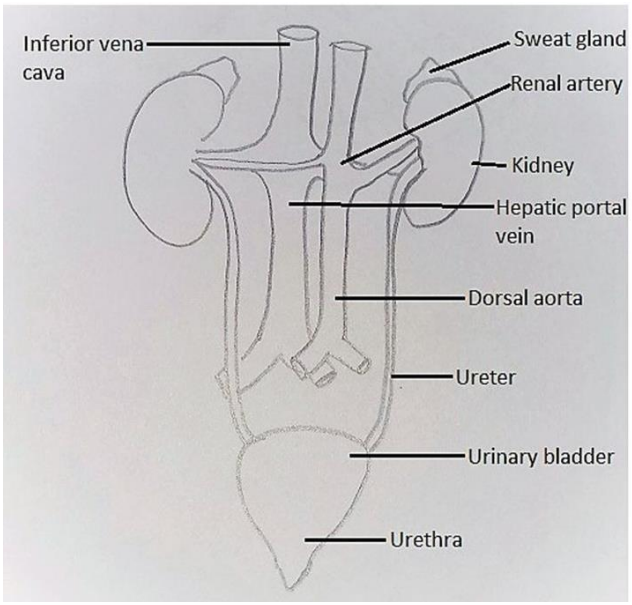
(a)Bowman’s capsule

(b)Ureter

(c)Loop of Henle

(d)None of the above

11. Which of the following is incorrectly marked in the given diagram?



(a) Renal artery and inferior vena cava

(b) Hepatic portal vein and sweat gland

(c) Dorsal aorta and ureter

(d) Urinary bladder and urethra

12.Why do we urinate more in wet and cold month?

(a) Kidney becomes more active

(b) Increase ADH secretion

(c)Sweating is reduced

(d) Impairment of water absorption

13. What is common between extensive network of blood vessels around walls of alveoli and in glomerulus of nephron?

(a) Thick-walled arteries richly supplied with blood

(b) Thin-walled veins poorly supplied with blood

(c) Thick-walled capillaries poorly supplied with blood.

(d) Thin-walled capillaries richly supplied with blood

14. Nitrogenous wastes excreted through urine in humans is

(a) Trimethylamine oxide

(b)Ammonia

(c)Uric Acid

(d)Urea

15. Many-plant waste products are stored in:

(a) Chloroplast

(b) Mitochondria

(c) Cellular vacuoles

(d) Cytoplasm

SECTION B -ASSERTION REASON TYPE QUESTIONS

1. **Assertion:** Failure of the kidneys leads to death of the person and there is way he can survive.

Reason: Transplant of kidneys in human is not possible.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Both Assertion and Reason are false.

2. **Assertion:** Artificial kidney is a device used to remove nitrogenous products from the blood through dialysis.

Reason: Re absorption does not occur in artificial kidney.

(a) Both Assertion and Reason are true and Reason is the correct explanation

of Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Assertion is false but Reason is true.

3. **Assertion:** Excretion is the biological process by which harmful wastes are removed from an organism's body.

Reason: The mode of excretion is completely same in both unicellular and multicellular organisms.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Assertion is false but Reason is true.

4. **Assertion:** Plants excrete various waste products during their life processes.

Reason: They produce urea just like humans.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Assertion is false but Reason is true.

5.**Assertion:** The main organ of human excretory system is kidney.

Reason: Kidneys perform the function of adding water and nitrogenous wastes from the body.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Assertion is false but Reason is true.

SECTION C-----CASE STUDY BASED QUESTIONS

DIALYSIS

Dialysis is a process that filters your blood when your kidneys no longer can. It isn't a cure, but it can help you feel better and live longer. You can choose from two types of dialysis: hemodialysis and peritoneal dialysis. Nephron is functional unit of kidney. The first scientific descriptions of these procedures date back to the 19th century and came from the Scottish chemist Thomas Graham, who became known as the "Father of Dialysis." Dialysis works on the principles of the diffusion of solutes and ultrafiltration of fluid across a semi-permeable membrane.

1) What is the use of heparin pump in dialysis machine?

a) Preventing blood clotting

b) Helps in blood clotting

c) Helps in blood formation

d) None of the above

2) Choose the correct pathway of urine in our body

(a) kidney → ureters → urethra → urinary bladder

(b) kidney → urinary bladder → urethra → ureters

(c) kidney → ureters → urinary bladder → urethra

(d)urinary bladder → kidney → ureters → urethra

3) What is the main toxic waste that kidneys filter from blood?

(a) Glucose

(b) Amino acids

(c) Water

(d) Urea.

4) Father of Dialysis is

(a) Isaac Newton

(b) Thomas Graham

(c) J C Bose

(d) None of these

ANSWER KEY

SECTION A ---MCQ

1. (a) Nephron
2. (d) All
3. (a) Excretion
4. (b) Dialysis
5. (a) Ketones
6. (c) 180 L/day
7. (c) Liver
8. (c) They will continue as normal
9. (d) Glomerulus
10. (c)Loop of Henle
11. b) Hepatic portal vein and sweat gland
12. (c)Sweating is reduced
13. (d) Thin walled capillaries richly supplied with blood
14. (d)Urea
15. (c) Cellular vacuoles

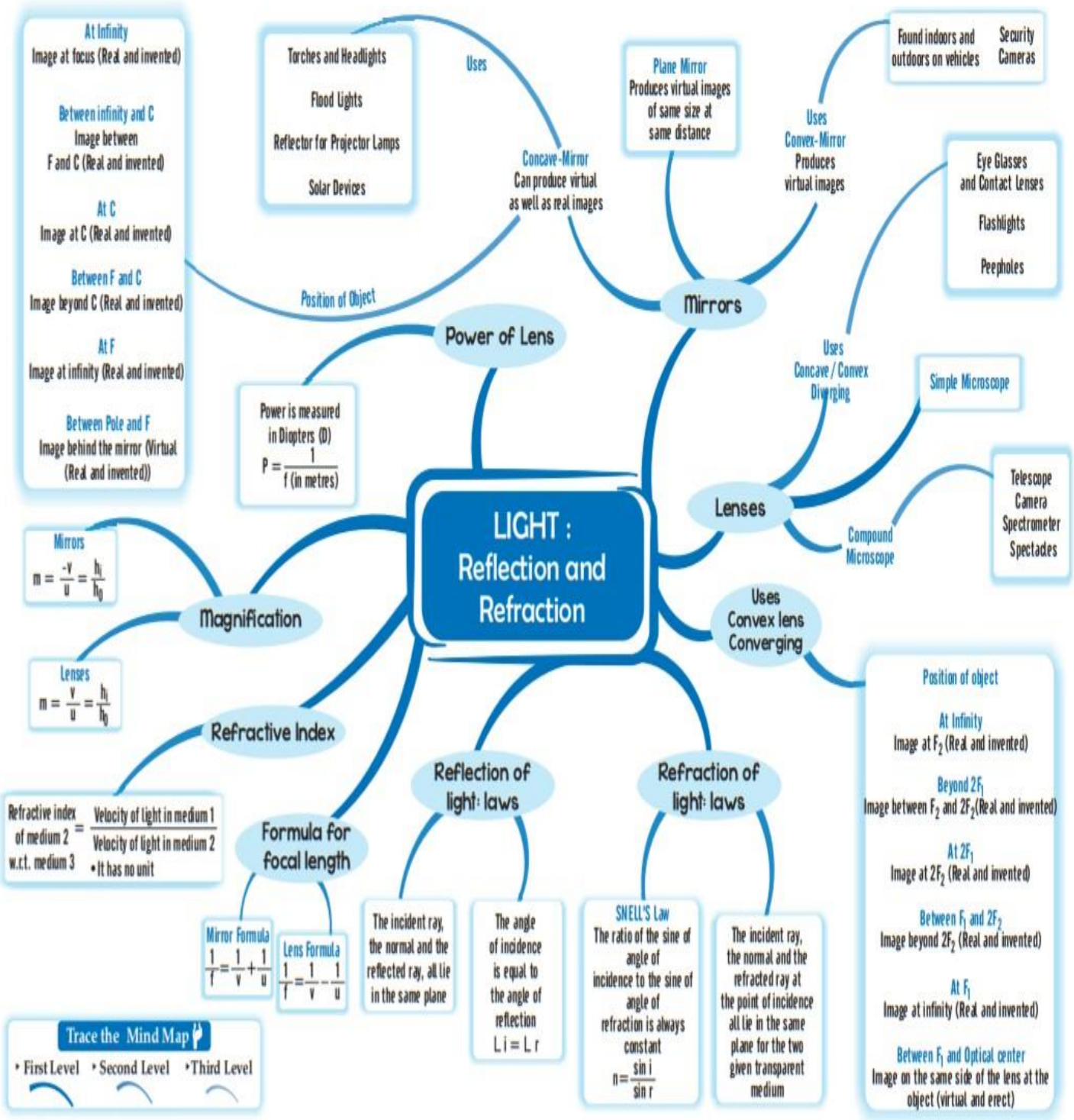
SECTION B ---ASSERTION REASON

1. (d) Both Assertion and Reason are false
2. (c) Assertion is true but Reason is false
3. (c) Assertion is true but Reason is false
4. (c) Assertion is true but Reason is false
5. (c) Assertion is true but Reason is false

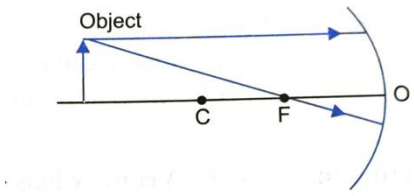
SECTION C --------CASE STUDY

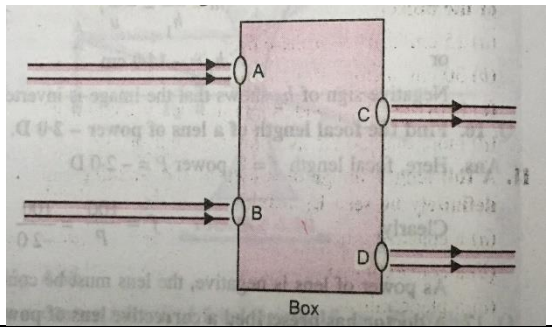
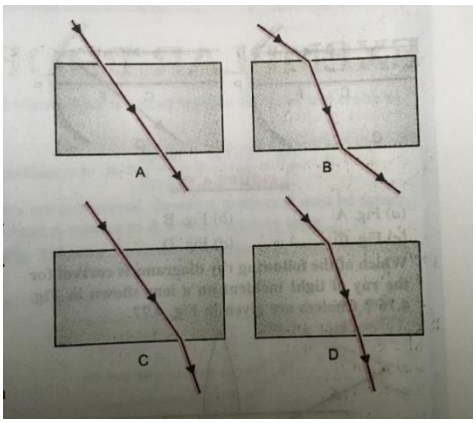
1. a) Preventing blood clotting
2. (c) kidney → ureters → urinary bladder → urethra
3. (d) Urea.
4. (b) Thomas Graham

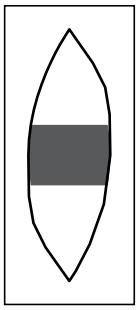
CHAPTER.10LIGHT- REFLECTION & REFRACTION

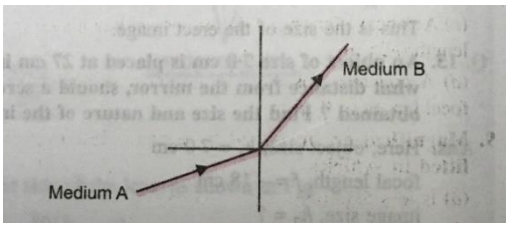


SECTION A-MCQ	
1	What is the radius of curvature of a plane mirror? (a) Depend on size of mirror (b) zero (c) Infinity (d) Depend upon the distance of object from mirror
2	Rays from Sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed so that size of its image is equal to the size of the object? (a) 15 cm in front of the mirror (b) 30 cm in front of the mirror (c) between 15 cm and 30 cm in front of the mirror (d) more than 30 cm in front of the mirror
3	Magnification produced by a mirror is -0.75 means (a) image is real and magnified. (b) image is real and diminished. (c) image is virtual and magnified (d) image is virtual and diminished.
4	An object is placed 60 cm in front of a concave mirror. The real image formed by the mirror is located 30 cm in front of the mirror. What is the object's magnification? (a) +2 (b) -2 (c) +0.5 (d) -0.5
5	A 10 mm long awl pin is placed vertically in front of a concave mirror. A 5 mm long image of the awl pin is formed at 30 cm in front of the mirror. The focal length of this mirror is (a) – 30 cm (b) – 20 cm (c) – 40 cm (d) – 60 cm
6	Under which of the following conditions a concave mirror can form a real image larger than the actual object? (a) When the object is kept at a distance equal to its radius of curvature (b) When object is kept at a distance less than its focal length (c) When object is placed between the focus and centre of curvature (d) When object is kept at a distance greater than its radius of curvature
7	An object is placed 40 cm in front of a convex mirror. The image appears 15 cm behind the mirror. What is the focal length of the mirror? (a) +24 cm

	(b) +11 cm (c) -11 cm (d) -24 cm
8	A negative sign in the magnification value indicate that the image is _____ (a) Real and inverted (b) Real and erect (c) Virtual and erect (d) Virtual and inverted
9	To determine the approximate value of the focal length of a given concave mirror, focus the image of a distant object formed by the mirror on a screen. The image obtained on the screen, as compared to the object is always: (a) Laterally inverted and diminished (b) Inverted and diminished (c) Erect and diminished (d) Erect and highly diminished
10	An object is kept in front of a concave mirror of focal length 20 cm. The image is three times the size of the object. The possible distances of the object from the mirror is- (a) -80/ 3 cm and -40/3 cm (b) -40/3 cm and -10/3cm (c) -50 /3 cm and -80/3 cm (d) -10/3cm and -80 cm
11	If the angle between the mirror and the incident ray is 50°, then the angle of reflection is a. 40° b. 50° c. 60° d. 110°
12	. If the focal length of a concave mirror is 18 cm, its radius of curvature will be a. 30 cm. b. 9 cm. c. 40 cm. d. 36 cm.
13	Which statement is not correct for a convex mirror? (a.) The image distance is always positive. (b). The object distance is with negative sign. (c). Always forms an image behind the mirror. (d.) The focal length is always negative
14	The image shows the path of incident rays to a concave mirror.  Where would the reflected rays meet for the image formation to take place? (a) Between F and O (b) Beyond C (c) Between C& F (d) Behind the mirror
15	For a concave mirror f = 5 cm, u = 10 cm, v = 10 cm, as per sign convention rules, which is correct? a) f = 5 cm, u = 10 cm, v = 10 cm, b) f = -5 cm, u = -10 cm, v = -10 cm,

	c) f = -5 cm, u = 10 cm, v = +10 cm, d) f = 5 cm, u = 10 cm, v = +10 cm,
16	Beams of light are incident through the holes A and B and emerge out of box through the holes C and D respectively as shown in Figure 4.71. Which of the following could be inside the box ? (a) A rectangular glass slab (b) A convex lens (c) A concave lens (d) A prism 
17	You are given a convex lens of focal length 20 cm. At what distance from the lens should you hold a candle flame to observe a virtual image of the flame ? (a) 0 - 20 cm (b) 20-40 cm (c) 40 - 60 cm (d) anywhere
18	Does focal length of a lens change on object distance ? (a) yes, always (b) yes, sometimes (c) no, never changing (d) can not say
19	You are provided with a convex lens of focal length 50 cm. To obtain a smaller inverted image, the distance of object from the lens should be (a) 50 cm (b) 100 cm (c) 20 cm (d) 120 cm
20	A ray of light passing through optical centre of a concave lens (a) bends towards normal (b) bends away from normal (c) does not bend at all (d) none of the above.
21	The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C and D in Figure. Which one of them is correct?  (a) A (b) B

	(c) C (d) D
22	If the central portion of a convex lens is wrapped in black paper as shown in the figure  (a) No image will be formed by the remaining portion of the lens (b) The full image will be formed but it will be less bright (c) The central portion of the image willbe missing (d) There will be two images each producedby one of the exposed portions of the lens
23	The speed of light in a transparent mediumis 0.6 times that of its speed in vacuum.The refractive index of the medium is: a)1.66 b)1.5 c)0.6 d)1.33
24	The refractive index of a medium '*x*' withrespect to '*y*' is 2/3 and the refractive index of y with respect to z is 4/3.The refractive index of medium '*z*' with respectof '*x*' is- **a)** 2/9 **b)** 9/8 **c)** 1/9 **d)** 5/6
25	You are given water, mustard oil, glycerin and kerosene. In which of these media a ray of light incident obliquely at same angle would bend the most? (a) Kerosene (b) Water (c) Mustard oil (d) Glycerin
26	Which of the following statements is true ? (a) A convex lens has 4 dioptre power having a focal length 0.25 m (b) A conves lens has - 4 dioptre power having a focal length 0.25 m (c) A concave lens has 4 dioptre power having a focal length 0.25 m (d) A concave lens has 4 dioptre power having a focal length of 0-25 m

27	In case of normal incidence, what would be the angle of deviation through a glass slab (a) minimum (b) maximum (c) 90° (d) 0°.
28	A light ray enters from medium A to medium B as shown in Figure . The refractive index of medium A relative to B will be  (a) Greater than unity (b) less than unity (c) equal to unity (d) zero
29	A convex lens forms a real, point size image of an object at infinity at a distance of 10 cm from the lens. Power of lens in dioptre is (a) 1 (b) 5 (c) 10 (d) 100
30	The image formed by a convex lens is of the same size of the object. If focal length of lens is 15 cm,distance of object from the lens is (a) 10 cm (b) 15 cm (c) 20 cm (d) 30 cm
	SECTION B **ASSERTON-REASON TYPE QUESTIONS** Question No.1 to 8 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true and R is not the correct explanation of A C. A is true but R is false D. A is False but R is true
1	Assertion (A): The focal length of the convex mirror will increase, if the mirror is placed in water. Reason (R): The focal length of a convex mirror of radius R is equal to, f = R/ 2 .
2	Assertion (A): An object is placed at a distance of f from a convex mirror of focal length f, its image will form at infinity

	Reason (R): The image distance in convex mirror can never be infinity.
3	Assertion: Large concave mirrors are used to concentrate sunlight to produce heat in solar cookers. Reason: Concave mirror converges the light rays falling on it to a point.
4	Assertion: The mirror used in search lights are concave mirror. Reason: In concave spherical mirror the image formed is always virtual.
5	Assertion: A ray of light incident along the normal to the plane mirror retraces its path after reflection from the mirror. Reason: A ray of light along the normal has angle of incidence as π /2 and hence, it retraces its own path after reflection from mirror
6	Assertion: A convex mirror is used as a driver's mirror. Reason: Because convex mirror's field of view is large and images formed are virtual, erect and diminished
7	Assertion : Concave mirror has a real focus. Reason : Concave mirror always forms real image
8	Assertion : Radius of curvature of a spherical minor is half its focal length. Reason : A ray of light incident parallel to principal axis of concave mirror , after reflection passes through principal focus .
9	Assertion (A) : Light does not travel in the same direction in all the media. Reason (R) : The speed of light does not change as it enters from one transparent medium to another.
10	Assertion(A) : A ray of light travelling from a rarer medium to a denser medium slows down and bends away from the normal. When it travels from a denser medium to a rarer medium, it speeds up and bends towards the normal. Reason (R) : The speed of light is higher in a rarer medium than a denser medium.
11	Assertion(A) : The height of an object is always considered positive. Reason (R) : An object is always placed above the principal axis in this upward direction.
12	Assertion(A) : Light gravels faster in air than glass Reason (R) :glass is denser than air
13	Assertion: Light travels in a straight line. Reason: Transparent objects allow the light to pass through them.
14	Assertion(A) : Refractive index has no units. Reason (R) : The refractive index is a ratio of two similar quantities.
15	Assertion(A) : unit of power is m^{-1} Reason (R) : power is the reciprocal of focal length
16	Assertion(A) : power of concave lens is negative Reason (R) : concave lens has virtual focus

SECTION C

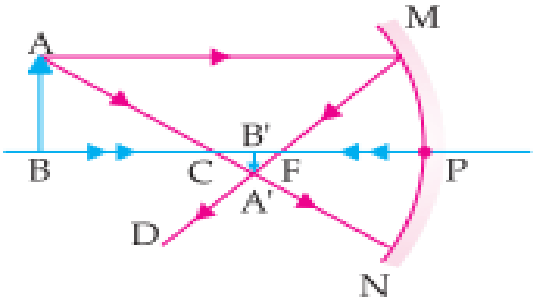
1

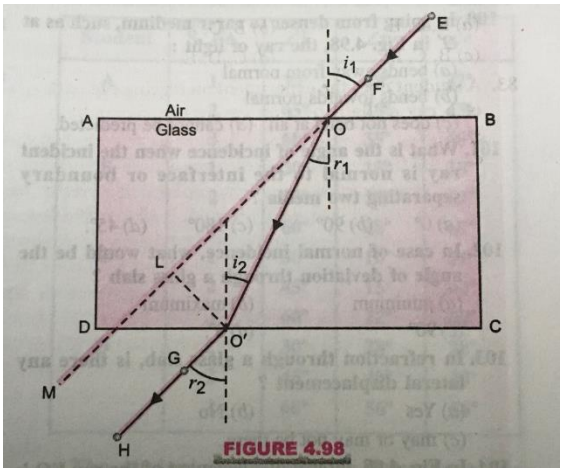
CASE-STUDY QUESTIONS

One of the most common uses for the convex mirror is the passenger-side mirror on your car. Convex mirrors are also often found in the hallway of various buildings including hospitals, hotels, schools, stores and apartment buildings . Usually, these mirrors are mounted to a wall or ceiling at points where hallways cross each other or make a sharp turn. This eliminates blind spots and provides people with a good overview of their surroundings. The convex mirror is also used to provide safety for motorists on roads, driveways and in alleys where there is a lack of visibility.

1.Select the characteristics of convex mirror due to which it is used as rear-view mirrors.
(1) Convex mirror always forms virtual and erect image
(II) Convex mirrors may form real or virtual image depending upon the position of object
(III) Convex mirrors provide a wider field of view as they are curved outwards.
(IV) Images formed by convex mirrors are usually larger than the object.
(a) Both (I) and (III)
(b) Both (II) and (III)
(c) Both (1) and (IV)
(d) Both (III) and (IV)

2. As the object is moved away from the focus of the convex mirror:
(a) size of image does not change
(b) size of image increase
(c) size of image decreases

	(d) cannot be ascertained as size of image depends upon the focal length of the convex mirror. 3. The magnification produced by a convex mirror is always: (a) Equal to +1 (b) Equal to-1 (c) Greater than +1 (d) Smaller than +1 4. Consider an object 7.0 cm in length which is placed at a distance of 20 cm in front of a convex mirror of radius of curvature 30 cm. The size and position of image formed is: (a) size of image = -3 cm, position of image= +60/7 cm (b) size of image = +3 cm, position of image = +60/7 cm (c) size of image = +3 cm, position of image = +7/60 cm (d) size of image = -3 cm, position of image= +7/60cm
2	Following figure illustrates the ray diagram for the formation of image by a concave mirror. The position of the object is beyond the centre of curvature of the concave mirror.  1. If the focal length of the concave mirror is 10 cm, the image formed will be at a distance _____. (A) Between 10cm and 15cm (B) Between 10cm and 20cm (C) Beyond 20cm (D) At 20 cm 2. In case of concave mirror, the image distance is _____ when image is formed in front of the mirror and _____ when the image is formed behind the mirror. (A) positive, negative (B) negative, negative (C) negative, positive (D) positive , positive 3. If the size of the object in the given figure is 5 cm and the magnification produced is –0.5. The size of the image is (in cm) _____ (A) –2.5 (B) –0.1 (C) 2.5 (D) 0.1

	4. An image formed by concave mirror is virtual, when the object is placed: (A) at infinity (B) at C (C) Between C and F (D) Between P and F
3	In the experiment on refraction of light through a rectangular glass slab ABCD, shown in the figure.  FIGURE 4.98 1.Do the points E and F lie on the same straight line as the points G and H? (a) Yes (b) No (c) sometimes (d) may or may not. 2. In the first refraction at 0 on the air glass interface AB, angle of refraction r_1 is : (a) always equal to angle of incidence i (b) always more than angle of incidence i (c) always less than angle of incidence i (d) sometimes more and sometimes less than i_1. 3. In the second refraction at O' on the glass air interface CD, angle of emergence r_2 is: (a) always equal to angle of incidence i_2 of second refraction (b) always greater than i_2 (c) always less than i_2 (d) cannot say 4. In Fig as $< r_1 = < i_2$. Therefore, angler_2: (a) = i_1 (b) $<i_1$ (c) > i_1 (d) cannot say.
4	One of the most direct and simplest uses of convex lens is in a magnifying glass. As the light rays enter the convex lens of the magnifying glass, it becomes focused on a specific focal point in front of the center of the lens. Once the magnifying glass is in the optimal distance, The focal point will reach the object, therefore maximum magnification of the object will be generated.

1.Allow sunlight to fall on a convex lens. Hold a paper screen on the opposite side. Move the paper screen gradually away from the lens, till a sharp bright spot is formed on the screen. This spot is due to:

(a) reflection of sunlight
(b) refraction of sunlight
(c) scattering of sunlight
(d) diffraction of sunlight.

2.in the above question, the sharp, bright spot on paper screen represents the image of :

(a) the sun (b) the atmosphere
(c) any distant object (d) none of the above.

3. what is focal length of convex lens ?

(a) distance of paper screen from the sun
(b) distance of lens from the sun
(c) distance of paper screen from the lens
(d) height of paper screen.

4. Image of the sun in the above question is :

(a) always real
(b) always virtual
(d) sometimes virtual.
(c) sometimes real

ANSWERS

MCQ

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	B	B	D	B	C	A	A	B	A	A	D	D	C	B
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
A	A	C	D	C	B	B	A	B	D	A	D	B	C	D

ASSERTION-REASON TYPE QUESTIONS

1	2	3	4	5	6	7	8
D	D	A	C	C	A	C	D
9	10	11	12	13	14	15	16
C	D	A	A	B	A	A	A

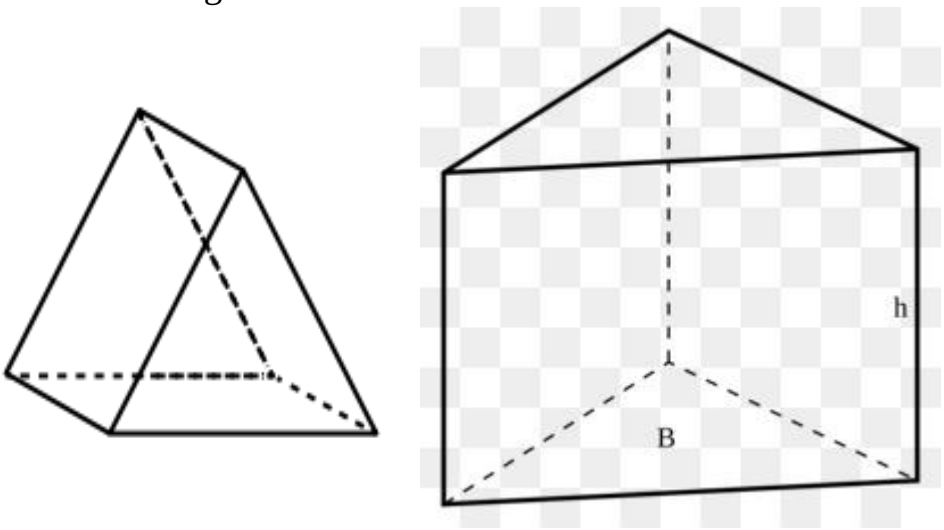
CASE-STUDY QUESTIONS

1.1	1,2	1.3	1.4	2.1	2.2	2.3	2.4
A	A	D	B	B	C	A	D
3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4
B	C	B	A	B	A	C	A

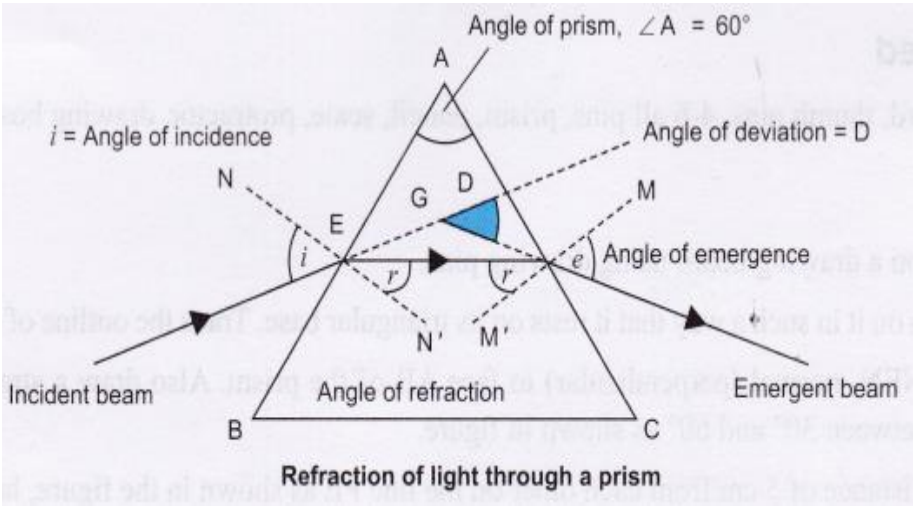
CHAPTER.11-HUMAN EYE AND THE COLOURFUL WORLD

FOCUS AREA

1. **Prism** is a homogeneous, transparent, refracting material (such as glass) enclosed by two inclined plane refracting surfaces at some fixed angle called refracting angle or angle of the **prism**. It has two triangular bases and three rectangular lateral surfaces which are inclined to each other.



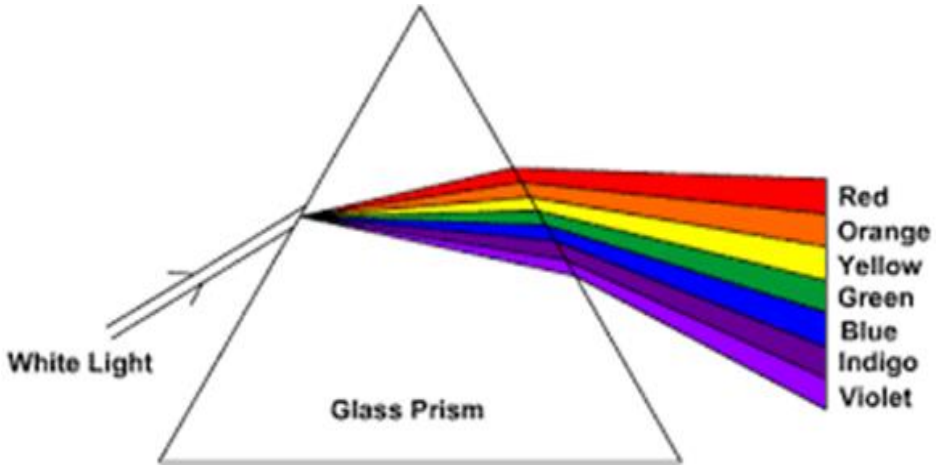
2.



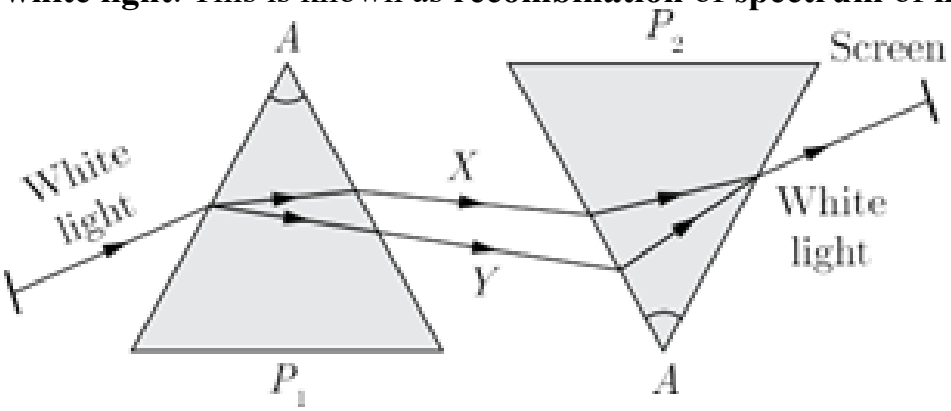
Refraction of light through a prism

$$i + e = A + D$$

3. The separation of visible **light** (**polychromatic light**) into its different colors is known as **dispersion**. The band of the coloured components of light beam is called the **Spectrum.**



4. When **white light** is passed through a triangular prism dispersion of **light** occurs and when another prism is kept inverted in the path of the dispersed **light** (as in the figure), the components recombine to form **white light**. This is known as **recombination** of **spectrum** of **light**.



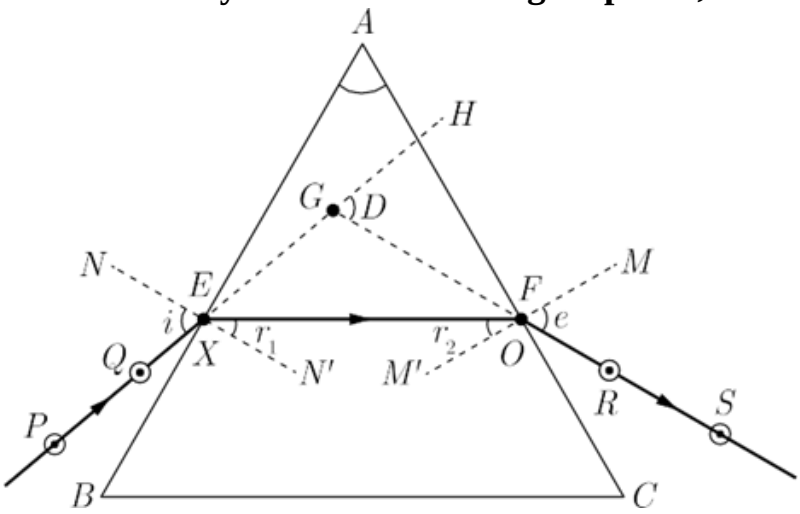
5. In the formation of rainbow the phenomena **of refraction, dispersion, total internal reflection** takes place.
6. The phenomenon of **atmospheric refraction** results in..
   a. Twinkling of stars
   b. Advanced sun rise and delayed sun set.
7. Tyndall effect (scattering of light)results in…

a. reddish appearance of sun early in the morning or evening.
b. blue colour of the clear sky

SECTION A

MULTIPLE CHOICE QUESTIONS

1. When a ray is refracted through a prism, then:



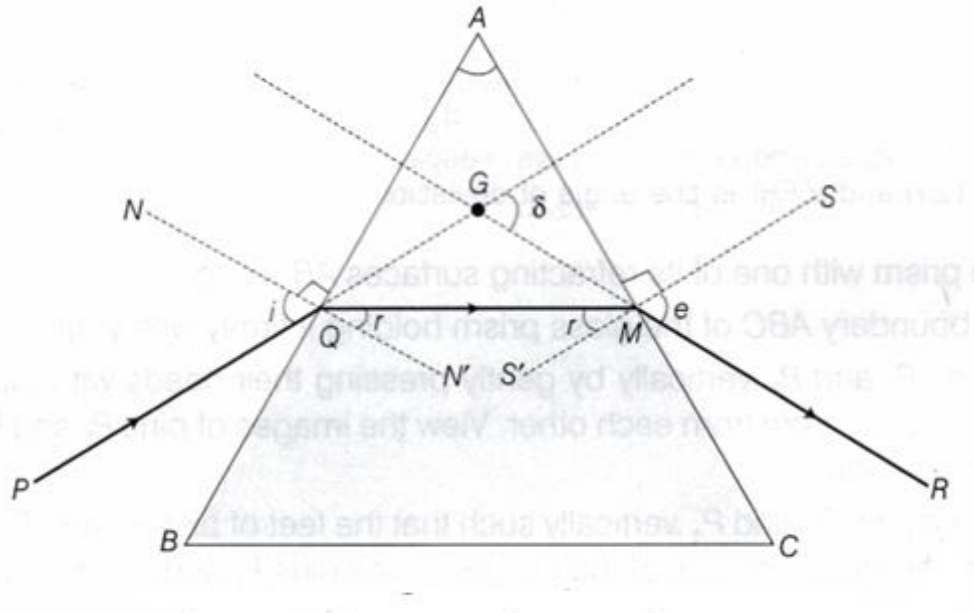
a. ∠i =∠D

b. ∠i =∠e+∠D

c. ∠D =∠e

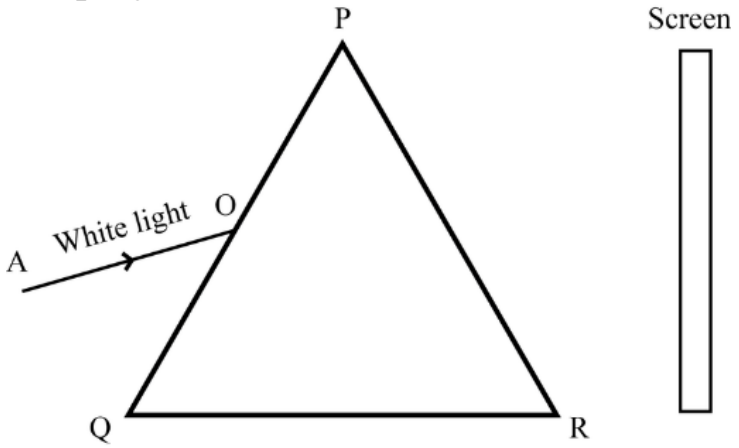
d. ∠i >∠r_1.

2**. A ray of light passes through a prism as shown in the figure given below? The angle δ is known is:**



a. Angle of the prism
b. Angle of dispersion
c. Angle of deviation
d. Angle of emergence

2. **What happens when light is passed from air to a glass prism obliquely?**



a. It reflects back
b. It bends away from the normal
c. It passes undeviated
d. bends towards the normal

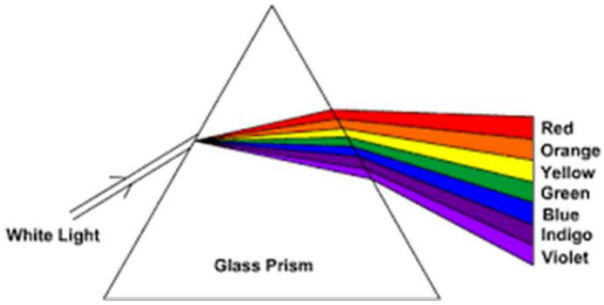
4. **Which colour deviates most in the formation of spectrum of white light by a prism?**

a. violet
b. orange
c. green
d. red

5. **The angle of deviation of a light ray when passed through a prism depends on**

a. The angle of the prism
b. The material of the prism
c. The surrounding medium
d. All the above

6. **Why is red light is at the top while violet at the bottom of the spectrum?**



a. Red light has the highest speed so it is refracted the least.
b. Violet light has the medium speed so it is refracted the least.
c. Violet light has the highest speed so it is refracted the least.
d. Red light has the slowest speed so it is refracted the least.

7. **When white light is passed through a hollow prism then there is**

a. neither dispersion nor deviation
b. Only dispersion
c. Only deviation
d. Both dispersion and deviation

8. The phenomenon due to which the colours of the rainbow can be seen when white light passes through a glass prism…

a. Scattering of light
b. Dispersion of light
c. Reflection of light
d. Diffraction of light

9. The following is an example of non - dispersive medium

a. Water
b. Air
c. Glass
d. oil

10. **In which of the following Tyndall effect is not seen?**

a. Sky appears blue at mid day
b. Sky appears reddish in the evening
c. Appearance of rainbow after rain

d. Danger signals are always red in colour.

11. **What is the reason behind twinkling of stars?**
a. Refraction of starlight while passing through different layers of earth's atmosphere.
b. Earth's atmosphere is not steady so there is a change in the refractive index of the layers.
c. both A & B
d. None of these

12. **Stars appear to twinkle but planets do not why?**
a. Planets are closer to earth in comparison to stars.
b. Stars have the ability to transmit light in fragments while planets transmit light continuously.
c. Light from stars travel faster than planets.
d. None of these

13. **Why does the sun appear flattened during sunrise and sunset? It is because ..**
a. The sun is closer to the earth.
b. The earth is rotating on its axis.
c. Due to atmospheric refraction.
d. The other planets block the sunlight.

14. **Angle of deviation is**
a. Angle by which incident ray deviates through prism.
b. Angle between incident ray and refracted ray.
c. Angle between incident ray and normal.
d. Angle between emergent ray and the normal.

15. **Refractive index of all the different layers of the atmosphere is different due to change in**
a. temperature
b. different gases in the atmosphere
c. different densities of gas
d. all of the above

16. **As you look at a rainbow, the colours go from top to bottom in what order?**

a. ROYGBIV
b. VIBGYOR
c. GYORVIB
d. YORGBIV

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

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

18. **Sun can be visible almost 2 minutes before the actual sunrise due to refraction of sun's rays, this change is known as**

a. early sunrise
b. sun shift
c. advanced sunrise
d. refraction of sun's rays

20. **The flattening of sun's disc at sunrise and sunset is due to**

a. advanced sunrise
b. delayed sunset
c. scattering of light
d. atmospheric refraction

21. **Total duration of the day increases by …….. minutes due to advanced sunrise and delayed sunset.**

a. 2
b. 4
c. 5
d. 8

22. **The angle between the refracting surfaces of prism is called angle of .....**

a. refraction
b. prism
c. reflection
d. both (a) and (b)

23. . **..... is a natural spectrum appearing in sky after a rain shower.**

a. Twinkling of stars

b. Advanced sunrise and delayed sunset
c. Colour of the sun at sunrise and sunset
d. Rainbow

24. **A student traces the path of a ray of light through a glass prism for different angles of incidence. He analysis each diagram and draws the following conclusion:**
I. On entering prism, the light ray bends towards the normal.
II. Light ray suffers refraction at the point of incidence and point of emergence while passing through the prism
III. Emergent ray bends at certain angle to the direction of the incident ray.
IV. While emerging from the prism, the light ray bends towards the vertex of the prism. Out of the above inferences, the correct ones are:

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

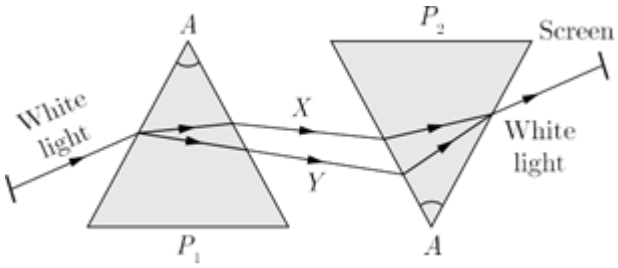
25. **During the experiment, to trace the path of ray of light through the glass prism, students reported the following observations:**
1. The ray of light from air to glass at the first refracting surface bends away from the normal after refraction.
2. At the second refracting surface, light rays travel from air to glass.
3. Light ray suffers two refractions on passing through a prism and in each refraction, it bends towards the base of the prism.
4. Light ray suffers two refractions on passing through a prism. In first refraction it bends away from the normal while in the second refraction it bends towards the normal. The correct observation(s) is/are:
a. 1 and 2 only
b. 3 only
c. 2 and 4 only
d. 1 and 4 only

26. **A student traces the path of a ray of light passing obliquely through a triangular glass prism for different values of angle of incidence. On analysing the ray diagrams, which one of the following conclusions is he likely to draw?**
a. The emergent ray is parallel to the incident ray.
b. The emergent ray bends at an angle to the direction of the incident ray.
c. The emergent ray and the refracted ray are at right angles to each other.
d. The emergent ray is perpendicular to the rectangular face of the prism.

27. **Which one of the following statements is correct?**
a. The rainbow is produced by the reflection of white sun light by water drops in the atmosphere.
b. The blue colour of the clear sky is due to scattering of light.
c. The stars appear higher in the sky than actually are due to scattering of light.
d. The planets twinkle at night due to atmospheric refraction of light.

28. **Rainbow is observed when the Sun is** ….
a. Vertically above the observer
b. Behind the observer
c. In front of the observer
d. Position is not defined

29. Here *X* and *Y*indicates:



a.

a.

78Green colour, violet colour

b. Red colour, violet colour

c. Violet colour, red colour

d. Green colour, red colour

30. When white light passes through a triangular glass prism, the colour which travels the fastest inside the prism is

a. Blue

b. Green

c. Red

d. Violet

SECTION B

ASSERTION / REASON (MCQ)

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

(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

31. Assertion(A) : White light is dispersed into its components when incident obliquely on one of the faces of a prism.
Reason (R) : Different colours of light bend through different angles with respect to the incident ray as they pass through a prism.

32. Assertion(A) : The phenomenon of scattering of light by the colloidal particles gives rise to Tyndall effect.
Reason (R): The components of white light having different wave lengths are equally scattered by the colloidal particles.

33. Assertion(A) : A rainbow is sometimes seen in the sky in rainy season only when observer's back is towards the Sun.
Reason (R) : The tiny droplets act as small prisms resulting in the formation of rainbow.

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

35. **Assertion(A):** The sky looks dark and black instead of blue in outer space.
Reason (R): No atmosphere in the outer space to scatter sunlight.

36. **Assertion (A):** The stars appear to twinkle, while the planets do not.
Reason (R): The stars are far from the earth in comparison to the planets.

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

38. **Assertion (A) :** Blue colour of the clear sky is due to atmospheric refraction.
Reason (R) : Blue light has shorter wavelength compared to red.

39. **Assertion:** Colour of sun is reddish at the time of sunset and sunrise**.**
Reason: The blue end of the visible spectrum get scattered off due to their smaller wavelengths and the light reaching earth's surface from sun is red.

40. **Assertion :** Recombination of spectrum can be done by arranging two triangular prisms in any inclination.
Reason : An identical glass prism kept inverted with respect to the first prism recombines the dispersed light coming from the first prism.

SECTION C

CASE STUDY BASED QUESTIONS

I. **The spreading of light by the air molecules is called scattering of light. The light having least wavelength scatters more. The reddish appearance of the sun at sunrise and sunset and the blue colour of the clear sky are due to the scattering of light. The colour of the scattered light depends on the size of particles. The smaller molecules in the atmosphere scatter smaller wavelengths of light. The amount of scattering of light depends on the wavelength of light. When light from sun enters the earth's atmosphere, it gets scattered by the dust particles and air molecules present in the atmosphere.**

41. To an astronaut in a spaceship, the colour of earth appears

(a) red
(b) blue
(c) white
(d) black

42. At the time of sunrise and sunset, the light from sun has to travel.

(a) longest distance of atmosphere
(b) shortest distance of atmosphere
(c) both (a) and (b)
(d) can't say

43. The colour of the clear sky appears blue, it is due to the

(a) refraction of light through the atmosphere
(b) dispersion of light by air molecules
(c) scattering of light by air molecules
(d) all of these.

44. At the time of sunrise and sunset

(a) Blue colour is scattered off and red colour of longer wavelength reaches our eye
(b) Red colour is scattered off and blue colour reaches

our eye.
(c) Green and blue colours are scattered off and yellow colour reaches our eye.
(d) None of these

45. The danger signs are made red in colour, because
(a) the red light can be seen from farthest distance.
(b) the scattering of red light is least.
(c) both (a) and (b)
(d) the red colour looks attractive.

II. Atmospheric refraction is the phenomenon of bending of light on passing through the different layers of the earth's atmosphere. As we move away from the surface of earth, density of air goes on decreasing. Local conditions like temperature etc. also affect the optical density of earth's atmosphere. On account of atmospheric refraction, stars seen appear to be higher than they actually are. Advanced sunrise, delayed sunset, oval appearance of the sun at sunrise and sunset, apparent twinkling of stars are due to atmospheric refraction.

46. Due to atmospheric refraction, apparent length of the day
(a) increases
(b) decreases
(c) remains the same
(d) all of these

47. Apparent position of the star appears raised due to
(a) atmospheric refraction
(b) scattering of light
(c) both (a) and (b)
(d) none of these

48. The refractive index of the layers of the earth's atmosphere is
a. Always constant throughout

b. Varies with distance from the surface of the earth.
c. Varies with time
d. Both “b” and “c”

49. Twinkling of stars and non-twinkling of planets is accounted for by

(a) scattering of light
(b) dispersion of light
(c) atmospheric refraction
(d) none of these

50. The sun appears to be risen before the actual sun rise because of

(a) atmospheric dispersion
(b) atmospheric refraction
(c) atmospheric reflection
(d) scattering of light

ANSWER KEY

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

KENDRIYA VIDYALAYA SANGATHAN ERNAKULAM REGION

CLASS X

SCIENCE TERM I PRACTICE TEST 2021

BLUE PRINT

Sl No	CHAPTER	WEIGHTAGE OF MARKS	WEIGHTAGE OF MARKS IN THE QN PAPER WITH EXTRA CHOICE QNS
1	CHMICAL REACTIONS AND EQUATIONS	16	19.2
2	ACIDS BASES AND SALTS		
3	METALS AND NONMETALS		
4	LIFE PROCESSES	10	12.8
5	LIGHT	14	16
6	HUMAN EYE AND THE COLOURFUL WORLD		
	TOTAL MARKS	40	48

* EXTRA QUESTIONS ARE INCLUDED [AS PER BOARD SAMPLE PAPER]AS CHOICE QUESTIONS

TOTAL NUMBER QUESTIONS CHAPTERWISE AND WEIGHTAGE OF MARKS

SL NO	CHAPTER	CHAPTER WISE NUMBER OF QNS INCLUDED IN THE QUESTION PAPER	TOTAL NO OF QNS INCLUDED IN THE QN PAPPER	TOTAL NO OF QUESTIONS INCLUDED IN THE QUESTION PAPER	NO OF QNS TO BE ANSWERED
1	CHEMICAL REACTIONS AND	10	24 QUESTIONS (24X.8=19.2MARKS)		

	EQUATIONS			60 QUESTIONS (60 X .8 = 48MARKS)	50 QUESTIONS (50 X .8 =40 MARKS)
2	ACIDS BASES AND SALTS	9			
3	METALS AND NONMETALS	5			
4	LIFE PROCESSES	16	16 QUESTIONS (16X0.8 =12.8MARKS)		
5	LIGHT	11	20 QUESTIONS (20X.8=16MARKS)		
6	HUMAN EYE AND THE COLOURFUL WORLD	9			
	TOTAL			48 MARKS	40 MARKS

SECTIONWISE WEIGHTAGE OF MARKS

SECTION	NO OF QUESTIONS INCLUDED	NO OF QUESTIONS TO BE ANSWERED	TOTAL MARKS
A	24	20	16
B	24	20	16
C	12	10	8
TOTAL	60	50	40
EACH QUESTION CARRIES 0.8 MARKS			

KENDRIYA VIDYALAYA SANGATHAN , ERNAKULAM REGION

TERM I EXAMINATION [PRACTICE TEST-1] 2021

CLASS X SCIENCE MM40 TIME : 90 min

General Instructions:

1. The Question Paper contains three sections.

2. Section A has 24 questions. Attempt any 20 questions.

3. Section B has 24 questions. Attempt any 20 questions.

4. Section C has 12 questions. Attempt any 10 questions.

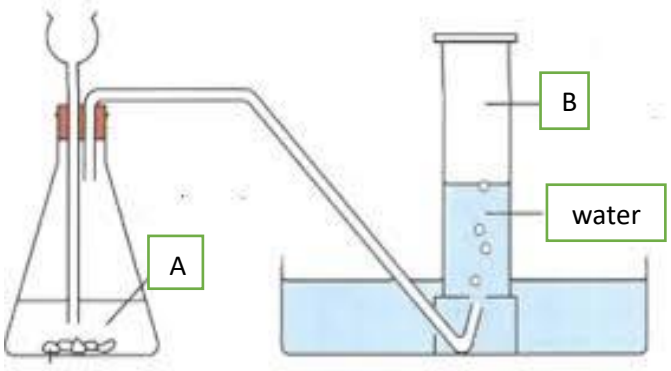
5. All questions carry equal marks.

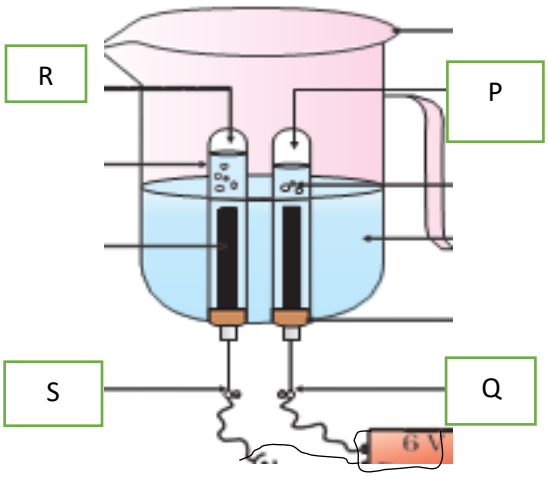
6. There is no negative marking.

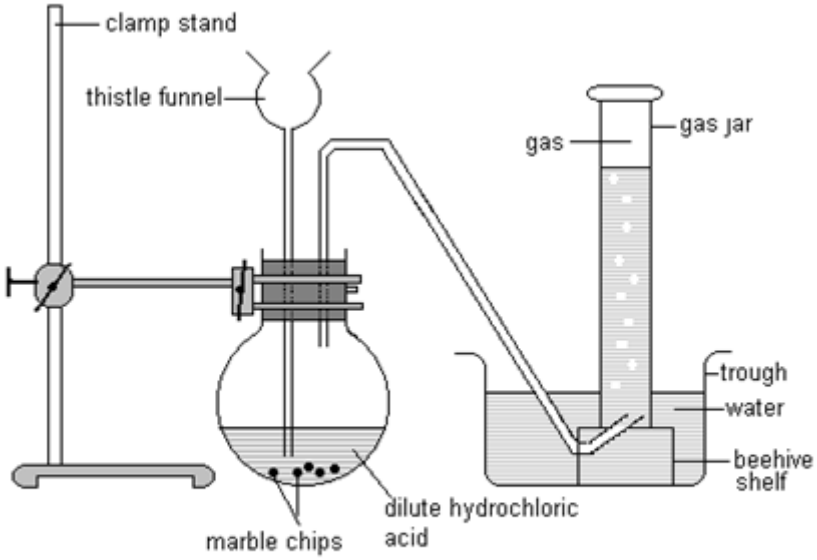
SECTION - A

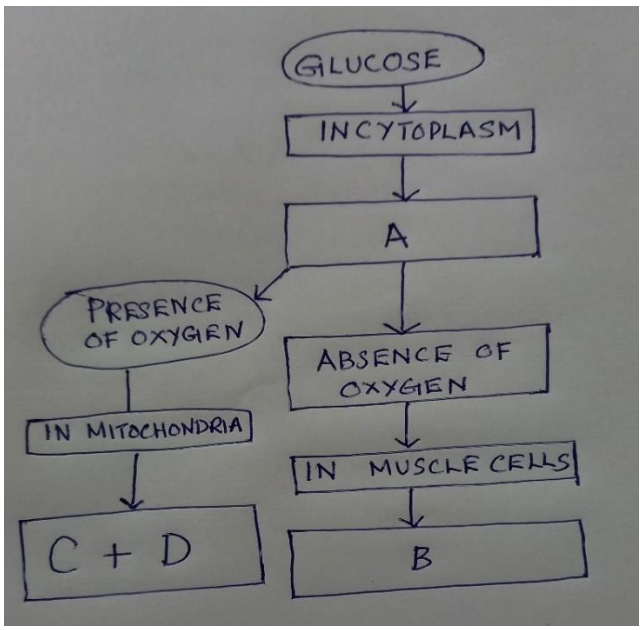
Section – A consists of 24 questions. **Attempt any 20 questions** from this section.

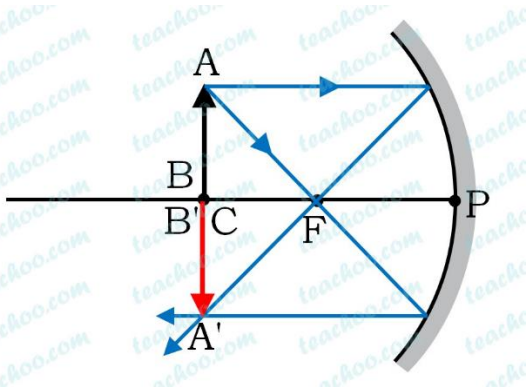
The first attempted 20 questions would be evaluated.

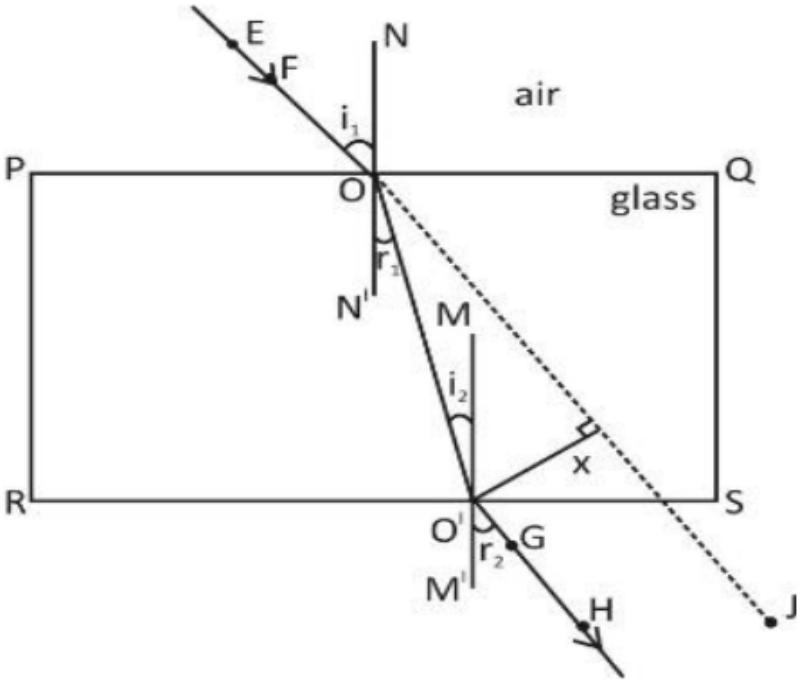
1	$Fe_2O_3 + Al \longrightarrow Al_2O_3 + Fe$ The reaction given above is an example of A. combination reaction B. displacement reaction C. redox reaction D. both B and C
2	In the given activity ,zinc granules are taken in the conical flask and treated with 'A'. A gas 'B' is collected in the gas jar. The gas 'B' is very light and burns to produce water . Identify A and B.  A. A is dilute hydrochloric acid and B is carbon di oxide B. A is baking soda solution and B is carbon di oxide C. A is dilute hydrochloric acid and B is hydrogen gas

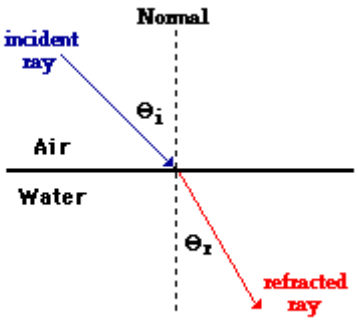
	D. A is dilute hydrochloric acid and B is helium
3	$HCl + X \rightarrow H_3O^+ + Cl^-$ In the given chemical reaction, X is ---------- A. Zinc metal B. water C. CO_2 D. NaCl
4	Heating of'a compound ' X' results in two gaseous products out of which one is very essential for sustainance of a large number of living forms on earth .The other gas when released in larger amount to the atmosphere, leads to environmental issues.Identify X. A. Iron sulphate B. calcium carbonate C. magnesium metal D. lead nitrate
5	On passing carbon di oxide through lime water it turns milky. A student passed carbon di oxide gas through lime water and failed to get this expected result .The probable reason for this observation is A. Lime water may not be freshly prepared one B. He must have passed carbon di oxide excessively through lime water. C. both A and B D. Only B
6	In the following activity of electrolysis of water, the gases evolved are collected in two different test tubes by downward displacement of water. Look at the figure and select the correct option  A. P-hydrogen Q-anode R-oxygen S- cathode B. P-oxygen Q-anode R-hydrogen S- cathode C. P-hydrogen Q-cathode R-oxygen S- anode D. P-anode Q-oxygen R-hydrogen S- cathode

7	A silver spoon is inserted inside a boiled egg for some time and found that it turned black . What is the black substance produced? A. Silver sulphide B. Copper oxide C. Silver metal power D. Carbon
8	A student made an experimental set up as shown in the given diagram. Name the gas produced.  Diagram of Apparatus A. chlorine B. hydrogen C. oxygen D. carbon di oxide
9	A student reacted magnesium carbonate with an acid to produce a salt. The same salt can be also produced by reacting the same acid with ----------. A. magnesium bicarbonate B. magnesium metal C. magnesium hydroxide D. all of the above
10	During electrolysis of water, hydrogen and oxygen are released in the ratio A. 1:2 B. 2:1 C. 4:1 D. 1:1

11	In the experiment to show that sunlight is necessary for photosynthesis, The correct sequence of steps is (i) Transfer the leaf in boiling alcohol (ii) Wash the leaf and pour iodine solution (iii) pluck the leaf and put the leaf in boiling water (iv) select a leaf from destarched plant and cover it with black paper and keep it in sunlight for 2 hours A.(iv), (i).(iii),(ii) B.(iv), (iii), (i), (ii) C.(iii), (iv),(ii), (i) D.(i), (iii), (ii), (iv)
12	Study the flow chart and identify A, B ,C and D  A. A-glycogen , B-ethyl aicohol, C-water, D- carbon dioxide B. A-pyruvate, B-lactic acid, C-Ethyl alcohol, D- carbon dioxide C. A-glycogen , B-ethyl alcohol, C-water, D- carbon dioxide D.A-pyruvate, B-lactic acid, C-water, D- carbon dioxide
13	The breathing rate in aquatic organisms is more than that in terrestrial organisms because A. Aquatic organisms need more energy than terrestrial organisms. B. The amount of dissolved oxygen is high in water. C. The amount of carbon di oxide is more in atmosphere D. The amount of dissolved oxygen is low in water compared to atmosphere
14	The chemical nature of saliva is A. alkaline B. Acidic C. neutral

	D. keeps changing from acidic to basic
15	The upper part of respiratory tract is provided with special structures which help to remove germs, dust and other harmful particles from inhaled air.These structures are A. ring like cartilage B. Ciliated cells C. Mucus D. Capillary network
16	Identify the digestive gland and their corresponding role in the process of digestion .Choose the **correct** option: Gland | Role in digestion i) | Leaf shaped gland ii) | Mushroom shaped gland with regeneration potential iii) | Infection of this gland causes mumps iv) | Excessive secretion leads to peptic ulcer/acidity problems A. i) pancreas ii) liver iii) gastric gland iv) salivary gland B. i) pancreas ii) gastric gland iii) salivary gland iv) liver C. i) gastric gland ii) liver iii) salivary gland iv) pancreas D. i) pancreas ii) liver iii) salivary gland iv) gastric gland
17.	Examine the below figure which shows the image formation by concave mirror when object is kept at the centre of curvature of the mirror and state which of the following option is correct regarding the focal length of the lens and the magnification produced. [The distance from C to P = 10 cm]  A. focal length is +5 cm and magnification is -1. B. focal length is -10 cm and magnification is -1. C. focal length is -5 cm and magnification is -1. D. focal length is -5 cm and magnification is +1.

18.	Study the given diagram showing refraction takes place through glass slab .  The emergent ray is parallel to the direction of the incident ray because A, When light ray travels from one medium to the other ,the refracted ray bends toward the Normal. B. The rectangular glass slab reflect most of the light rays at its surface RS C. First the light rays bend away from the normal and then towards the normal D. The extent of bending of the ray of light at the opposite parallel faces PQ and RS of the rectangular glass slab is equal and opposite.
19	The kind of mirror used as rear view mirror in vehicle is ----------. A. Convex mirror because its gives real and enlarged image B. Concave mirror because it gives erect and enlarged image of far away objects. C. Plane mirror because it gives wide field of view and erect and small image. D. Convex mirror because it gives small and erect image and covers a large field of view.
20.	A student has to produce different types of images of a given object . He wants to produce real, virtual, inverted, erect, bigger, smaller and same size image of the particular object. He is provided with concave mirror, convex mirror, concave lens and convex lens. He is asked to choose only one device for the experiment.Which among the given devices the student can select to produce the required kind of images? A. concave mirror only B. convex lens only C. concave lens only D. either concave mirror or convex lens

21.	When light ray travels from air to water, the refractive index of water with respect to air is 1.33 .What is the refractive index of air with respect to water?  A. 1.33 B. 1/1.33 C. 1.33 x velocity of light in air D. 1.33/ velocity of light in water
22.	A ray of light passing through a rectangular glass slab emerges without any deviation. The ray is incident A. obliquely on the surface of glass slab at zero degree B. in such a way that angle of incidence is 90 degree C. in such a way that angle of incidence is zero degree D. in such a way that angle of refraction is 90 degree
23.	An optical device produces a magnification of +1. The device may be A. plane mirror B. concave mirror C. convex mirror D. concave lens
24.	Red light is used as danger signal because A. Red light undergoes least scattering B. red light does not undergo refraction C. Red has smaller wavelength D. Atmospheric refraction does not happen
SECTION B Section - B consists of 24 questions (Sl. No.25 to 48**). Attempt any 20 questions** from this section. **The first attempted 20 questions would be evaluated.**	
25	Aqueous solutions of sodium sulphate and barium chloride are mixed together. Name the precipitate formed in this reaction.

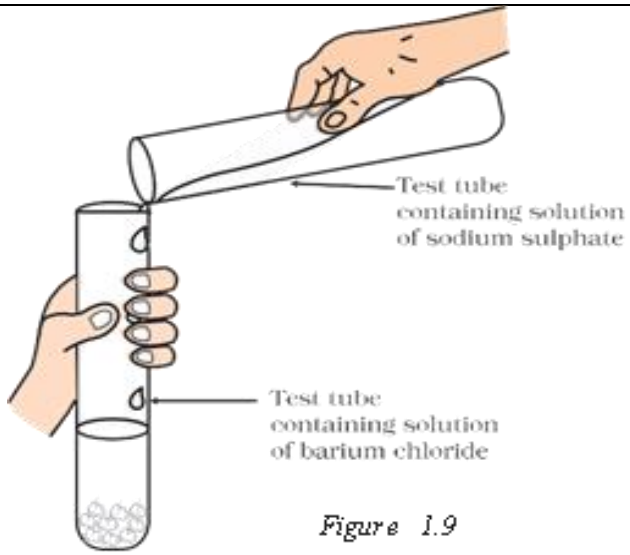
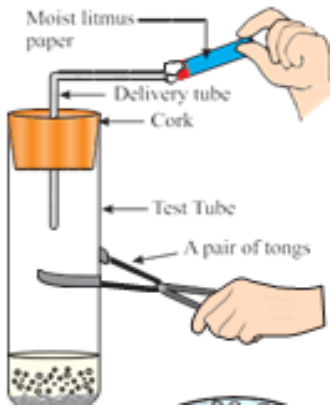


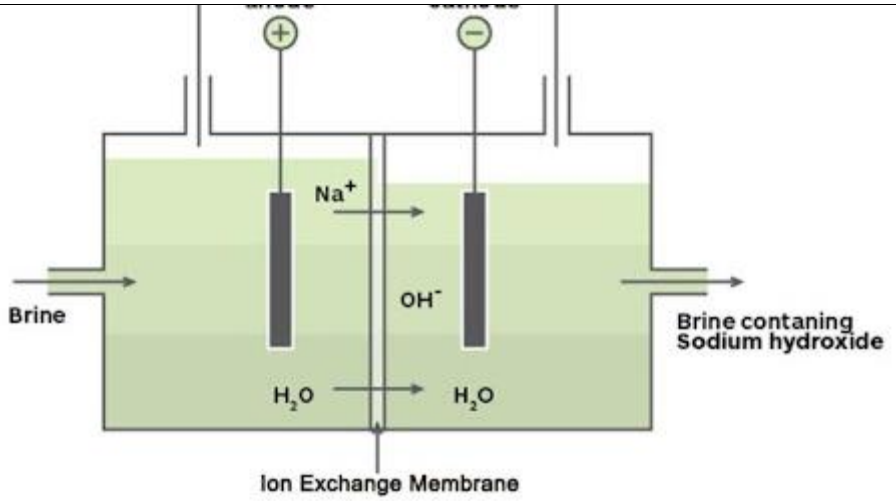
Figure 1.9

A.Barium sulphide
B. Barium sulphate
C. Sodium chloride
D. Barium sulphite

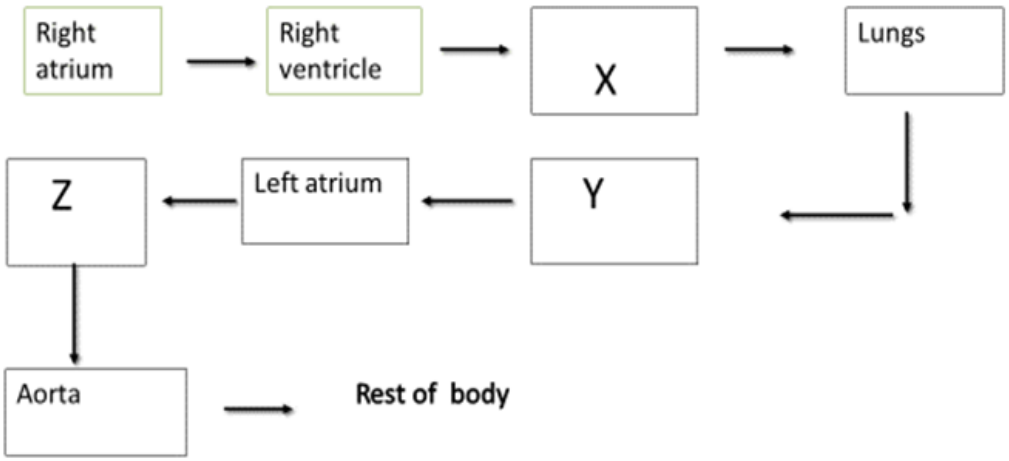
26 Concentrated sulphuric acid is mixed with sodium chloride . HCl gas released is tested with dry blue litmus paper. The dry litmus does not turn red. If we replace it with moist blue litmus paper, it turns red.Why?

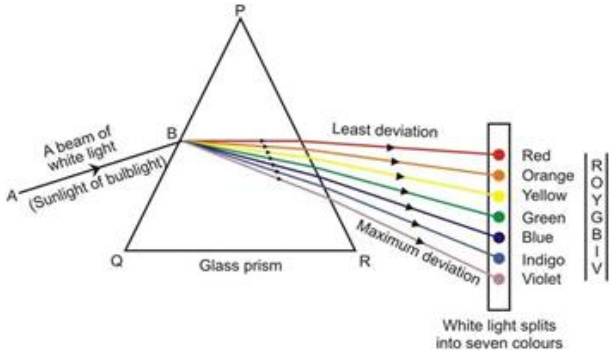
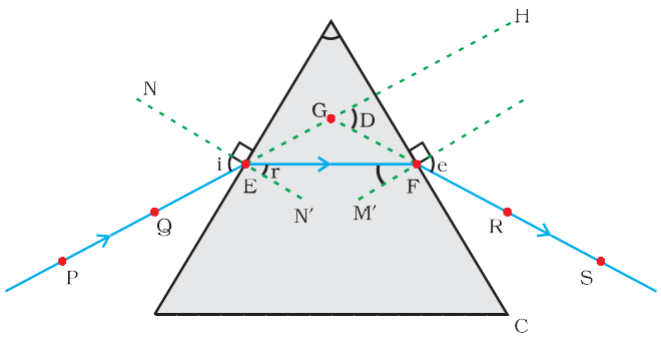


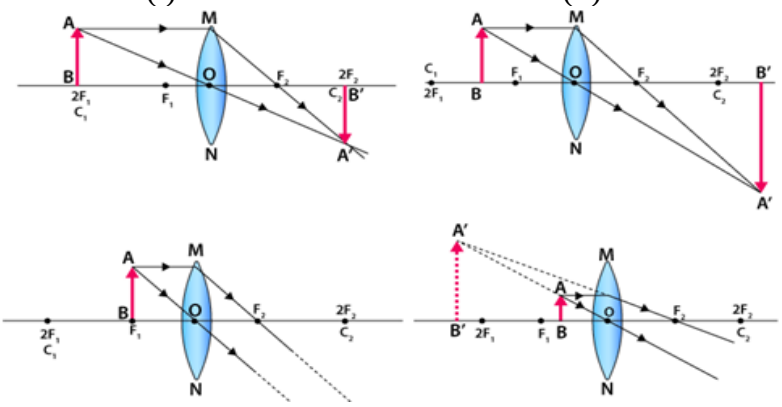
A. In the absence of moisture, dry HCl vapours do not release hydrogen ions. In presence of moisture hydrogen ions are released.
B. In the absence of moisture, dry HCl vapours release hydrogen ions and turns red.
C. Blue litmus turns red because sulphuric acid comes out of test tube.
D. Dry HCl vapours ionises and not able to turn blue litmus to red.

27	 In the above arrangement, brine is undergoing electrolysis .The gas released at anode is A. chlorine B. hydrogen C. oxygen D. carbon di oxide
28	When baking powder is heated or mixed in water, the reaction takes place is A. $NaHCO_3 + H^+ \rightarrow CO_2 + H_2O$ + Sodium salt of acid B. $Na_2CO_3 + H^+ \rightarrow CO_2 + H_2O$ + Sodium salt of acid C. $NaHCO_3 + OH^- \rightarrow CO_2 + H_2$ + Sodium chloride D. $NaHCO_3 + OH^+ \rightarrow$ CO2 + H2 + Sodium chloride
29	A Blue crystalline salt used as fungicide is heated strongly to see that it changes to white powder .On adding water to this white powder, it regains its blue colour. Identify the salt and give reason for change in colour. 

	A. Copper sulphate, loses water of crystallisation and its colour on heating and regains colour by regaining water . B. Iron sulphate, loses water of crystallisation and its colour on heating and regains colour by regaining water. C. Copper sulphite, gains water of crystallisation and colour on heating and regains colour by regaining water. D. Iron sulphate, undergoes chemical change and loses its colour on heating and regains colour by Regaining water.
30	The chemical name and chemical formula of plaster of Paris is A. Calcium bi carbonate , $Ca(HCO_3)_2$ B. Calcium sulphate , $CaSO_4.H_2O$ C. Calcium sulphate hemi hydrate $Ca\ SO_4$.½ H2O D. Calcium sulphate hemihydrate $Ca_2\ SO_4$. 1/2 H2O
	Question No. 31 to 35 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true and R is not the correct explanation of A C. A is true but R is false D. A is False but R is true
31	**Assertion**: Calcium metal when put in water starts floating . **Reason**: Calcium produces hydrogen gas which stick to the surface of metal.
32	**Assertion**: Different colours of light bend through different angles with respect to the incident ray, as they pass through a prism **Reason**: The violet light bends the least while the red bends the most.
33	**Assertion**: Ionic compounds have high melting and boiling points. **Reason**: A considerable amount of energy is required to break the strong inter-ionic attraction.
34	**Assertion**: Transpiration helps in temperature regulation of plants. **Reason**: In plants, the effect of root pressure in transport of water is more important at day time.
35	**Assertion**: Mixing an acid or base with water results in decrease in the concentration of ions per unit volume **Reason**: The strength of acids and bases depends on the number of H^+ ions and OH^- ions produced, respectively.
36	Which of the following is NOT a step in urine formation in kidney? A. glomerular filtrate is passed through the tubules of nephron and reach collecting vessel. B. glomerular filtrate is produced ,which is collected by Bowman's capsule C. useful materials in glomerular filtrate are reabsorbed D. blood is supplied by the renal veins to the glomerulus and release glomerular filtrate.
37	Which of the following statement is INCORRECT?? A. Amphibians and many reptiles have three-chambered hearts, and tolerate some mixing of the oxygenated and de-oxygenated blood streams. B. In fishes, blood goes only once through the heart during one cycle of blood flow

	C. In fishes, there is mixing up of oxygenated and deoxygenated blood in their heart. D. In birds, the separation of the right side and the left side of the heart is useful to keep oxygenated and deoxygenated blood from mixing. .
38	During day time, generally, the major driving force in the movement of water through xylem in plants is A. Energy released by breaking ATP B. Transpiration pull C. Gravitational force D. None of the above
39	Rings of cartilage are present around the trachea, helps to A. Filter the dust and germs entering the trachea. B. Stabilise the trachea and makes it rigid while breathing C. Prevent collapsing of air passages when air is not present in it. D. Both B and C
40	Identify the parts X, Y and Z on the path way of blood circulation in human heart:  A. X-pulmonary vein Y- right atrium Z-pulmonary artery B. X- vena cava Y- pulmonary veins Z-right atrium C. X-pulmonary artery Y- pulmonary veins Z-left ventricle D. X-pulmonary veins Y- pulmonary artery Z- left ventricle
41	A concave lens of focal length 25 cm and a convex lens of focal length 50 cm are used in combination . The power of the combination of lenses is A. -2D B. -0.2D C. +2D D. +0.06D
42	A 4cm tall object is placed at a distance of 20 cm in front of a concave mirror of focal length 15 cm. How much distance should he move the object so that he can get an inverted image of height 4cm on a screen ,placed at the same distance where he placed the object ?

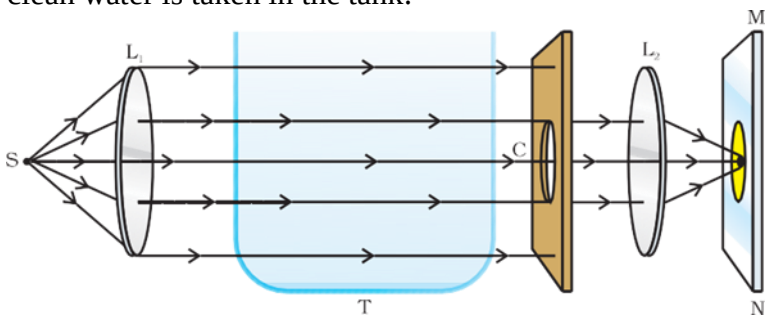
	A. 5cm towards the mirror B. 5cm away from the mirror C. 10 cm towards the mirror D. 10 cm away from the mirror
43	Which among the following is **NOT** a true statement regarding the reaction of metals with water? A. Calcium metal reacts with cold water less violently to form calcium hydroxide and hydrogen gas B. Magnesium metal reacts with hot water violently to give magnesium hydroxide and hydrogen gas C. Iron metal react with steam to produce iron oxide and hydrogen gas D. Sodium metal reacts with cold water violently to form sodium hydroxide and hydrogen gas
44	A group of students arranged an experimental set up in the following way and made observations.  Choose the INCORRECT statement : A. The red light bends the least while the violet the most. B. The rays of each colour emerge along different paths and thus become distinct due to difference in the angles of refraction. C. If all these colours of the spectrum are allowed to pass through second identical inverted prism, white light emerges from the other side of the second prism. D. Sunlight has only seven components .
45	Angle of deviation in the given figure is  A. angle ‘i’ B. angle ‘e’ C. angle ‘ F’

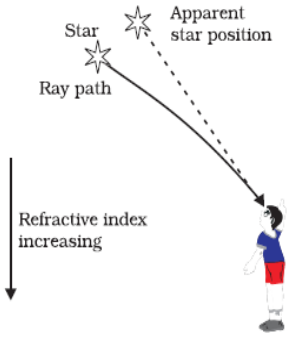
	D. angle ‘D’
46	The basic phenomenon behind the twinkling of stars is A. atmospheric refraction B. scattering of light C. dispersion D. reflection
47	A concave lens has focal length of 20 cm. At what distance should the object from the lens be placed so that it forms an image at 10 cm from the lens? Also, find the magnification produced by the lens. A. object distance -20cm ; magnification -0.5 B. object distance- 20cm ; magnification +0.5 C. object distance+ 15cm ; magnification - 0.5 D. object distance -6.6cm ; magnification +0.5
48	 A hand lens is used to get magnified image of letters. The correct ray diagram for the image formation here is (i) (ii)  (iii) (iv) A. (i) B. (ii) C. (iii) D. (iv)

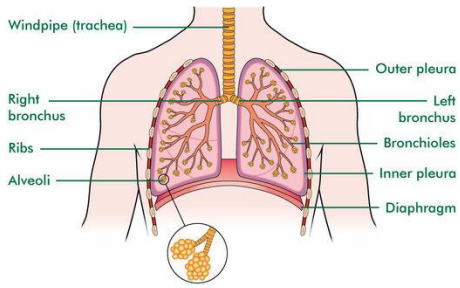
SECTION – C

Section- C consists of three Cases followed by questions. There are a total of 12 questions in this section. Attempt any 10 questions from this section.

The first attempted 10 questions would be evaluated.

CASE	An experimental set up is arranged in the following way. [S-strong source of white light. L1 and L2 -convex lenses, T- transparent glass tank containing clear water. C- circular hole made in a cardboard. MN-screen] About 200 g of sodium thiosulphate (hypo)is dissolved in about 2 L of clean water is taken in the tank. 
49	When we switch on the source of light S, A. a white bright spot of light fall on the screen B. the screen becomes dark C. an orange red spot of light falls on the screen D. a blue spot of light falls on the screen
50	About 1 to 2 mL of concentrated sulphuric acid is mixed to the water in the tank. Now the observation is A. observed blue light from the three sides of the glass tank. B. The white spot changes to an orange red and then to crimson colour C. A is the correct observation D. Both A and B are correct observation
51	The above experiment demonstrate the phenomenon of A. dispersion B. scattering of light C. refraction D. internal reflection
52	A daily life situation where we observe the above phenomenon is A.  B 

	C.  D.  A. B. C. D.
CASE	The chemical elements can be broadly divided into metals, metalloids and nonmetals according to their shared physical and chemical properties. All metals have a shiny appearance (at least when freshly polished) are good conductors of heat and electricity, form alloys with other metals, and have basic oxide. Metalloids are metallic-looking brittle solids that are either semiconductors or exist in semiconducting forms, and have amphoteric or weakly acidic oxides. Typical nonmetals have a dull, coloured or colourless appearance,are brittle when solid, are poor conductors of heat and electricity, and have acidic oxides. 
53	Generally, metal atoms shows a tendency to A. Accept electrons in a chemical reaction B. Share electrons in a chemical reaction C. Donate electrons in a chemical reaction D. do not take part in a chemical reaction
54	An amphoteric oxide among the following is A. sulphur di oxide B. sodium oxide C. aluminium oxide

	D. calcium oxide
55	At ordinary temperature, the surfaces of some metals are covered with a thin layer of oxide. This oxide layer protects those metals from corrosion also.An example of a metal of this kind is A. Copper B. Aluminium C. Iron D. silver
56	Generally, when nitric acid react with metals hydrogen gas is not evolved. As an exception to this, metals which react with very dilute nitric acid to produce hydrogen gas is A. magnesium and manganese B. aluminium and magnesium C. copper and manganese D. silver and copper
CASE	In land animals the respiratory surface is internalized as linings of the lungs. Gas exchange in the lungs occurs in millions of small alveoli. These air sacs communicate with the external environment via a system of airways, or hollow tubes, of which the largest is the trachea, which branches in the middle of the chest into the two main bronchi. The blood brings carbon dioxide from the rest of the body for release into the alveoli, and the oxygen in the alveolar air is taken up by blood in the alveolar blood vessels to be transported to all the cells in the body. 
57	The blood vessel which brings deoxygenated blood to the lungs for its oxygenation is A. superior vena cava B. pulmonary artery C. pulmonary vein D. aorta
58	How is carbon di oxide mainly transported in our body A. through blood plasma B. with the help of haemoglobin C. from one cell to the other cell by diffusion D. one cell to the other cell by osmosis
59	The volume of air remaining in the lungs after maximum forceful expiration

	A. lung capacity B. Lung volume C. Residual volume D. Partial volume
60	Choose the correct statement: A. The energy released during the process of respiration is used to make an ATP molecule from ADP and inorganic phosphate. B. The energy released during the process of respiration is used to make an ATP molecule from ADP and organic phosphate. C. ATP is broken down giving rise to a fixed amount of energy cannot drive the endothermic reactions taking place in the cell. D. Anaerobic process and aerobic process of respiration release equal number of ATP

KENDRIYA VIDYALAYA SANGATHAN , ERNAKULAM REGION

TERM I EXAMINATION 2021

CLASS X SCIENCE MM:40

TIME : 90 min

MARKING SCHEME

QN NO	ANSWERS
	SECTION A
1	D. both B and C
2	C. A is dilute hydrochloric acid and B is hydrogen gas
3	B. water
4	D. lead nitrate
5	C. both A and B
6	C. P-hydrogen Q-cathode R-oxygen S- anode
7	A. Silver sulphide
8	D. carbon di oxide
9	D. all of the above
10	B. 2:1
11	B. (iv), (iii), (i), (ii)
12	D.A-pyruvate, B-lactic acid, C-water, D- carbon dioxide
13	D. The amount of dissolved oxygen is low in water compared to atmosphere
14	A. alkaline
15	B. Ciliated cells
16	D . i) pancreas ii) liver iii) salivary gland iv) gastric gland
17	C. focal length is -5 cm and magnification is -1.
18	D. The extent of bending of the ray of light at the opposite parallel faces PQ and RS of the rectangular glass slab is equal and opposite.
19	D. Convex mirror because it gives erect image and covers a large field of view.
20	D.either concave mirror or convex lens
21	B. 1/1.33
22	C. in such a way that angle of incidence is zero degree
23	A. plane mirror
24	A. Red light undergoes least scattering
	SECTION B
25	B. Barium sulphate
26	A.In the absence of moisture, dry HCl vapours do not release hydrogen ions. In presence of moisture hydrogen ions are released.

27	A. chlorine
28	A. $NaHCO3 + H^+ \rightarrow CO_2 + H_2O$ + Sodium salt of acid
29	A. Copper sulphate, loses water of crystallisation and colour on heating and regains colour by regaining water .
30	C.Calcium sulphate hemi hydrate Ca SO4 ½ H2O
31	A
32	C
33	A
34	A
35	B
36	D. blood is supplied by the renal veins to the glomerulus and release glomerular filtrate
37	C. In fishes, there is mixing up of oxygenated and deoxygenated blood in their heart.
38	B. Transpiration pull
39	D. Both B and C
40	C. X-pulmonary artery Y- pulmonary veins Z-left ventricle
41	A. -2D
42	D. 10 cm away from the mirror
43	B. Magnesium metal reacts with hot water violently to give magnesium hydroxide and hydrogen gas
44	D. Sunlight has only seven components .
45	D. angle 'D'
46	A. atmospheric refraction
47	B. object distance- 20cm ; magnification +0.5
48	D. (iv)
SECTION C	
49	A. a white bright spot of light fall on the screen
50	D. Both A and B are correct observation
51	B. scattering of light
52	B
53	C. Donate electrons in a chemical reaction
54	C. aluminium oxide
55	B. Aluminium
56	A. magnesium and manganese
57	B. pulmonary artery
58	A. It is more soluble in water than oxygen is and hence is mostly transported in the dissolved form in our blood
59	C. Residual volume
60	A. The energy released during the process of respiration is used to make an ATP molecule from ADP and inorganic phosphate.

KENDRIYA VIDYALAYA SANGATHAN , ERNAKULAM REGION

TERM I EXAMINATION [PRACTICE TEST-2] 2021

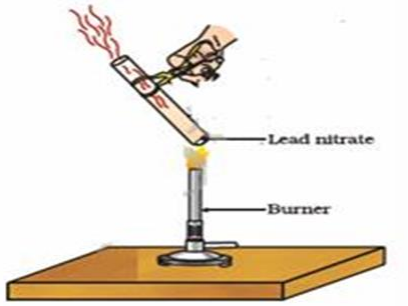
CLASS X -SCIENCE

MM:40 **TIME : 90 min**

General Instructions:

1. The Question paper contains three sections.
2. Section A has 24 Questions. Attempt any 20 questions.
3. Section B has 24 questions. Attempt any 20 questions.
4. Section C has 12 questions. Attempt any 10 questions.
5. Al questions carry equal marks.
6. There is no negative marking.

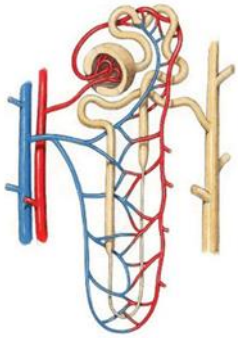
SECTION A

<table>
<tr><th>No:</th><th>Questions</th><th>Marks</th></tr>
<tr><td>1.</td><td>Which of the following can undergo a chemical reaction?
a) Mg SO_4 + Pb
b) Mg SO_4 + Fe
c) Zn SO_4 + Fe
d) Cu SO_4 + Fe</td><td>0.8</td></tr>
<tr><td>2.</td><td>The brown fumes produced in this experiment is
 

a) CO_2
b) NO_2
c) SO_2
d) H_2</td><td>0.8</td></tr>
<tr><td>3.</td><td>Which of the given options correctly represents the parent acid and base of potassium carbonate?
<table>
<tr><th>OPTION</th><th>PARENT ACID</th><th>PARENT BASE</th></tr>
<tr><td>a</td><td>HCl</td><td>KOH</td></tr>
<tr><td>b</td><td>H_3PO_4</td><td>$Ca(OH)_2$</td></tr>
<tr><td>c</td><td>H_2CO_3</td><td>KOH</td></tr>
</table></td><td>0.8</td></tr>
</table>

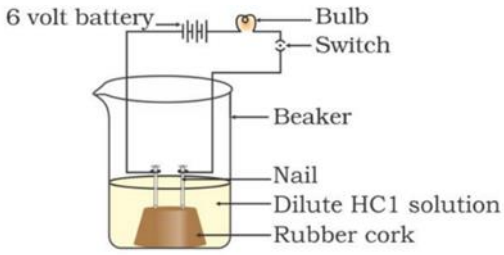
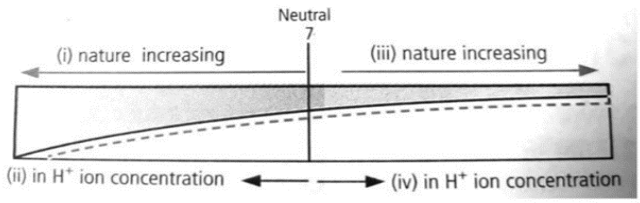
		d	H_2SO_4	NaOH	
4.	Reaction between X and Y, forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z? a. Conducts electricity in molten state b. Occurs as solid c. Has low melting point d. Both a. and b.				**0.8**
5.	Which of the following statements about the reaction below are incorrect? $2PbO + C \text{ ---> } 2Pb + CO_2$ 1. Lead is getting reduced. 2. Carbon dioxide is getting oxidised. 3. Carbon is getting oxidised. 4. Lead oxide is getting reduced. (a) 1 and 2. (b) 1 and 3 (c) 1, 2 and 4. (d) 2 and 4				**0.8**
6.	Which of the following are present in a dilute aqueous solution of hydrochloric acid? a) $H_3O^+ + Cl^-$ b) $H_3O^+ + OH^-$ c) $Cl^- + OH^-$ d) unionised HCl				**0.8**
7.	Pumpkin grows best in a soil having a pH range of 6.0 to 6.8. If the soil in garden has a pH range of 4.5, which substance needs to be added to the soil in order to grow pumpkins. a) Salt b) Lime c) Sand d) Compost				**0.8**
8.	The chemical formula of Gypsum is a) $CaSO_4.1/2H_2O$ b) $CaSO_4.2H_2O$ c) $CaSO_4.H_2O$ d) $CaSO_4.3H_2O$				**0.8**
9.	Which option gives the balanced chemical equation of the reaction? (a) $HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2HOH$ (b) $2HCl + Ba(OH)_2 \rightarrow BaCl_2 + 2HOH$				**0.8**

	(c) $2HCl + Ba(OH)_2 \rightarrow BaH_2 + 2HCl + O_2$ (d) $HCl + 2Ba(OH) \rightarrow 2BaCl_2 + 2HOH + O_2$	
10.	The pH of gastric juice released during digestion is a) Less than 7 b) More than 7 c) Equal to 7 d) Equal to zero	**0.8**
11.	Match the words of Column (A) with that of Column (B) *S.No. Column (A) Column (B)* A) Veins (i) Translocation of food B) Arteries (ii) De-Oxygenated blood C) Phloem (iii) Transport water & nutrients D) Xylem (iv) Oxygenated blood (a) A - (ii), B - (i), C - (iv), D - (iii) (b) A - (iii), B - (ii), C - (i), D - (iv) (c) A - (iv), B - (iii), C - (ii), D - (i) (d) A - (ii), B - (iv), C - (i), D - (iii)	**0.8**
12.	Which of the following statement(s) is (are) true about heart? (i) Left atrium receives oxygenated blood from different parts of body while right atrium receives deoxygenated blood from lungs. (ii) Left ventricle pumps oxygenated blood to different body parts while right ventricle pumps deoxygenated blood to lungs. (iii) Left atrium transfers oxygenated blood to right ventricle which sends it to different body parts. (iv) Right atrium receives deoxygenated blood from different parts of the body while left ventricle pumps oxygenated blood to different parts of the body (a) (i) (b) (ii) (c) (ii) and (iv) (d) (i) and (iii)	**0.8**
13.	Nephrons are made up of a cluster of thin-walled capillaries called _____which is associated with a cup like structure called as _____ and the long tube which terminates through this capsule.	**0.8**

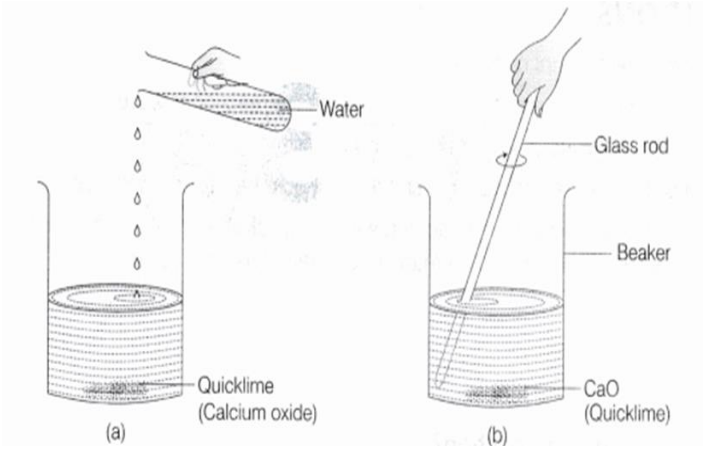
	 (a) Glomerulus, Bowman's capsule (b) Neurons, Bowman's capsule (c) Nephrons, Bowman's capsule (d) Glomerulus, Convoluted tubule	
14.	Which of the following statement(s) is /are true about respiration? (i) During inhalation, ribs move inward and diaphragm is raised (ii) In the alveoli, exchange of gases takes place i.e., oxygen from alveolar air diffuses into blood and carbon dioxide from the blood into the alveolar air (iii) Haemoglobin has a greater affinity for carbon dioxide than oxygen (iv) Alveoli increase surface area for exchange of gases (a) (i) and (iv) (b) (ii) and (iii) (c) (i) and (iii) (d) (ii) and (iv)	**0.8**
15.	The internal energy reservoir in autotrophs is a) Glycogen b) Protein c) Starch d) Fatty acid	**0.8**
16.	The only reptile having four chambered heart a) Snake b) Turtle c) Lizard d) Crocodile	**0.8**
17.	A ray of light is incident on a plane mirror making an angle of 90^{o} with the mirror surface. The angle of reflection for this ray of light will be	**0.8**

	a) 45^o b) 90^o c) 0^o d) 60^o	
18.	A student very cautiously traces the path of ray through a glass slab for different values of the angle of incidence (i). He then measures the corresponding values of the angle of refraction (r) and the angle of emergence (e) for every value of the angle of incidence. On analysing these measurements of angles, his conclusion would be a) i > r > e b) i = e > r c) i < r < e d) i = e < r	**0.8**
19.	If the magnification of a lens has positive value, the image is (a) Real (b) virtual and erect (c) inverted (d) none of these	**0.8**
20.	Unit of power of a lens is a) m b) cm c) m-1 d) cm-1	**0.8**
21.	The food coming from the stomach is ---------- (a) alkaline (b) acidic (c) neutral (d)none of these	**0.8**
22.	Which colour deviates the most in the formation of the spectrum of white light by a prism? a) Violet b) Orange c) Green d) Red	**0.8**
23.	Refractive index of ethanol is 1.361 and it is known that benzene is optically denser than ethanol. Which could be the refractive index of benzene?	**0.8**

	a) 1.350 b) 1.281 c) 1.333 d) 1.501	
24.	In an experiment to trace a path of a light through a triangular glass prism, a student would observe that the emergent ray a) is parallel to the incident ray b) is along the same direction of the incident ray c) gets deviated and bends towards the tip of the prism d) gets deviated and bends towards the base of the prism.	**0.8**
	SECTION B	
Section - B consists of 24 questions (Sl. No.25 to 48). Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.		
25.	The correct decreasing order of the metals in the activity series is a) Ca, Mg, Hg, Fe b) Hg, Ca, Mg, Fe c) Ca, Mg, Fe, Hg d) Mg, Ca, Fe, Hg	**0.8**
26.	Sodium chloride is a/an _____ compound. (a) Ionic (b) Covalent (c) coordinate (d) none	**0.8**
27.	An aqueous solution turns red litmus solution blue. Excess addition of which solution of the following solution would reverse the change: (a)Baking Powder (b)Lime (c)Ammonium Hydroxide solution (d)Hydrochloric Acid.	**0.8**
28.	The following reaction is an example of a $4NH_3 + 5O_2$ -----> $4NO + 4H_2O$ 1. displacement reaction 2. combination reaction 3. redox reaction 4. neutralisation reaction	**0.8**

	(a) 1 and 4. (b) 2 and 3 (c) 1 and 3. (d) 3 and 4	
29.	Observe the following set up and identify the correct statements.  i) Glucose and alcohol solutions conduct electricity. ii) Acid produce hydrogen ions, $H^+(aq)$, in solution, which are responsible for their acidic properties. iii) Alkalies such as sodium hydroxide, calcium hydroxide, show electrical conductivity in water iv) Bulb will not glow if we take benzene. (a) (i), (iii) and (iv) (b) (ii) and (iii) (c) (ii), (iii) and (iv) (d) All the statements are correct.	**0.8**
30.	What are (i), (ii), (iii) and (iv) in the given figure?  (i) (ii) (iii) (iv) (a) Acidic Decrease Basic Increase (b) Basic Decrease Acidic Increase (c) Acidic Increase Basic Decrease (d) Basic Increase Acidic Decrease	**0.8**
	Question No. 31 to 34 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: **A. Both A and R are true and R is the correct explanation of A**	

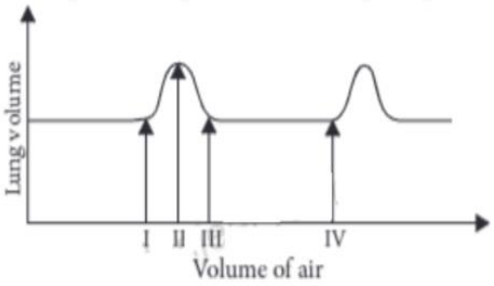
	B. Both A and R are true and R is not the correct explanation of A **C. A is true but R is false** **D. A is False but R is true**	
31.	Assertion(A): Light travels faster in glass than in air. Reason(R): Glass is denser than air	**0.8**
32.	Assertion(A): Ionic compounds have high melting and boiling points. Reason(R): A large amount of energy required to break the strong interionic attraction.	**0.8**
33.	Assertion(A):Transpiration is a necessary evil Reason(R) :It causes water loss but helps in absorption of water and minerals.	**0.8**
34.	Assertion(A): KNO_3 is a basic salt. Reason(R): KNO_3 is formed from a strong acid and a strong base.	**0.8**
35.	Choose the correct option (i) Cramps occur due to formation of acetic acid in leg muscles (ii) Cramps are formed due to lack of oxygen (iii) Cramps occur due to formation of lactic acid in leg muscles (iv) Cramps occur due to lack of glucose in body. a) (i) and (iv) b) (ii) and (iii) c) (i) and (ii) d) All of the above	**0.8**
36.	Identify the natural phenomenon, which is caused by the dispersion of sunlight in the sky. a) Twinkling of stars b) Stars seem higher than they actually are c) Advanced sunrise and delayed sunset d) Rainbow	**0.8**
37.	The electronic configuration of three elements X , Y and Z are X (2,8), Y (2,8,7) and Z (2,8,2). Which of the statement given below is correct? a) X is a metal b) Y is a metal c) Z is non metal d) Y is a non metal and Z is metal	**0.8**

38.	Ajit is an expert to fix arrows on the targets. But he cannot shoot an arrow on a fish in the water. What may be the reason behind it? a) Reflection of light b) Refraction of light c) Refractive index of water d) Refractive index of air	**0.8**
39.	Which of the following is the correct feature of lymph? (a) It is similar to the plasma of blood, but it is colourless and contains less proteins (b) It is similar to the WBC of blood, but is colourless and contain more proteins. (c) It is similar to the RBCs of blood and red in colour. (d) It contains more fats.	**0.8**
40.	Teacher asked Meenu to do following experiment. * Take small amount of calcium oxide or quick lime in a beaker. * Slowly add water to this. * Touch the beaker.  Which of these following reactions will take place? (a) $CaO + H_2O \text{ ----------> } Ca(OH)_2 + H_2O$ (b) $CaO + H_2O \text{----------> } CaO_2$ (c) $CaO + H_2O \text{-------> } CaH_2 + \text{heat}$ (d) $CaO + H_2O \text{-------> } Ca(OH)_2 + \text{heat}$	**0.8**

41.	The power of the lens is +2.5D. Its focal length in cm will be (a) + 40 (b) – 40 (c) + 80 (d) – 80	**0.8**
42.	According to New Cartesian sign convention a) Focal length of concave mirror is positive and convex mirror is negative b) Focal length of both convex mirror and concave mirror is positive c) Focal length of both convex mirror and concave mirror is negative d) Focal length of concave mirror is negative and convex mirror is positive	**0.8**
43.	Breaking up of colours into the component colours is called a) Dispersion b) Refraction c) Scattering d) reflection	**0.8**
44.	Arteries and veins are connected by a network of extremely narrow tubes called: a) Sieve tubes b) Capillaries c) Vena cava d) Valves	**0.8**

45.	The angle between the incident ray reflected ray is 60^0. What is the angle of incidence? (a) 35^0 (b) 30^0 (c) 32.5^0 (d) 60^0	**0.8**
46.	Transfer of one or more valence electrons from a metal to non-metal takes place in case of (a) chemical bonding (b) molecular bonding (c) ionic bonding (d) covalent bonding	**0.8**
47.	47. When iron nail is kept in blue coloured copper sulphate solution, after a while the colour obtained in the test tube for the solution is (a) Blue. (b) Brown (c) Green. (d) Red	**0.8**
48.	When light travels from an optically denser to an optically rarer medium: a) It slows down b) Its speed increases c) Speed remains same d) Depends up on the two media in contact.	**0.8**

SECTION C Section- C consists of three Cases followed by questions. There are a total of 12 questions in this section. Attempt any 10 questions from this section. The first attempted 10 questions would be evaluated		
Case	Respiratory disease causes an immense worldwide health burden. It is estimated that 235 million people suffer from asthma, more than 200 million people have chronic obstructive pulmonary disease (COPD), 65 million endure moderate-to-severe COPD , more than 100 million adult population experience sleep disordered breathing, 8.7 million people develop tuberculosis (TB) annually , millions live with pulmonary hypertension and more than 50 million people struggle with occupational lung diseases. At least 2 billion people are exposed to the toxic effects of biomass fuel consumption, 1 billion are exposed to outdoor air pollution and 1 billion are exposed to tobacco smoke. Each year, 4 million people die prematurely from chronic respiratory disease. Infants and young children are particularly susceptible. Nine million children under 5 years of age die annually and lung diseases are the most common causes of these deaths. Pneumonia is the world's leading killer of young children. Asthma is the most common chronic disease, affecting about 14% of children globally and is still rising. COPD is the fourth leading cause of death worldwide and the numbers are growing. The most common lethal cancer in the world is lung cancer, which kills more than 1.4 million people each year, and the numbers are growing. Respiratory tract infections caused by influenza kill 250 000–500 000 people and cost 71–167 billion US dollars annually. Respiratory infections are ranked as the greatest single contributor to the overall burden of disease in the world.	
49.	The respiratory disorder in which inflammation of air sacs in lungs takes place is called: (a) Pneumonia (b) Asthma (c) Bronchitis (d) None of these	**0.8**
50.	People living at sea level have around 5 million RBCs per cubic millimetre of their blood whereas those living	**0.8**

	at an altitude of 5400 metres have around 8 million. This is because at high altitude (a) people eat more nutritious food, therefore more RBCs are formed. (b) people get pollution-free air to breathe and more oxygen is available. (c) atmospheric O_2 level is less and hence more RBCs are needed to absorb the required amount of O_2 to survive. (d) there is more UV radiation which enhances RBC production.	
51.	The graph given below illustrates the changes in lung volume during the process of breathing.  The change from II to III indicates the (a) Movement of diaphragm away from the lungs (b) Expansion of the thoracic cavity (c) Movement of air out of the lungs (d) Expansion of ribs.	**0.8**
52.	The end product of aerobic respiration is (a) NADH (b) Oxygen (c) ADP (d) CO2+ ATP + H2O	**0.8**
Case	Salts are formed by reactions of acids and bases, strong acids react with strong bases to form neutral salt. Weak acids react with strong bases to form basic salts whose aqueous solution turned red litmus blue, phenolphthalein pink and universal indicator blue. Acidic salts are formed by strong acids and weak bases. Na2CO3 and NaHCO3 are salts of NaOH (strong base) and H2CO3 (Carbonic acid) weak acid and are basic in nature. Electrolysis of brine solution gives caustic soda (NaOH), H2 gas and Cl2. Bleaching powder (CaOCl2) is prepared when slaked lime reacts with dry chlorine gas used as disinfectant, washing soda is used to	

	remove permanent hardness of water. Crystalline salts are hydrated and lose water of crystallisation on heating, may change colour and become amorphous (powdery). Gypsum on heating at 373K gives Plaster of Paris, used in making chalk, plastering fractured bones. NaHCO3 is baking soda used in making crisp pakora and as antacid.	
53.	Sulphuric acid reacts with milk of magnesia, the salt formed is (a) $MgSO_4$ (b) $Mg(HSO_4)_2$ (c) $MgSO_3$ (d) $Mg(HSO_3)_2$	**0.8**
54.	A visually challenged student has to perform the experiment to find the presence of acidic salt in given solution. The acid base indicator prepared by him will be (a) Blue litmus (b) Clove oil (c) Red cabbage extract (d) Hibiscus extract	**0.8**
55.	Baking powder is a mixture of (a) $NaCO_3$ and Tartaric acid (b) $NaHCO_3$ and Tartaric acid (c) $NaCO_3$ and Sulphuric acid (d) $NaHCO_3$ and Sulphuric acid.	**0.8**
56.	Common name of Calcium hypochlorite is (a) Baking Powder (b) Baking Soda (c) Washing Soda (d) Bleaching Powder	**0.8**
Case	Shyam participated in a group discussion in his interschool competition on the practical application of light and was very happy to won the award for his school. On that very evening, his father celebrated the day with a family dinner. At a particular moment, Shyam observed in a curve plate, the image of a	

	person's mobile sitting on his back side. Person's mobile was fell off which the person didn't know about it. Shyam went to the person and informed about this. The person was thankful to Shyam.	
57.	From which side of the plate Shyam observed this incident? (a) Inner curve (b) Outer curve (c) Plane surface (d) None of the above	**0.8**
58.	The part of the curved plate was acting like which type of mirror? (a) Plano concave mirror (b) Concave mirror (c) Convex mirror (d) Plane mirror	**0.8**
59.	State the nature and size of image formed by this mirror. (a) Virtual, Erect & Diminished (b) Virtual, Erect & Enlarged (c) Real, Inverted & Diminished (d) Real, Inverted & Enlarged	**0.8**
60.	These types of mirrors are used (a) as shaving mirrors (b) in headlights (c) by Dentists (d) as rear-view mirror in vehicles	**0.8**

ANSWER KEY

SECTION A

No:	Questions	Marks
1	d	**0.8**
2	b	**0.8**
3	c	**0.8**
4	c	**0.8**
5	a	**0.8**
6	a	**0.8**
7	b	**0.8**
8	b	**0.8**
9	b	**0.8**
10	a	**0.8**
11	d	**0.8**
12	c	**0.8**
13	a	**0.8**
14	d	**0.8**
15	c	**0.8**
16	d	**0.8**
17	c	**0.8**
18	b	**0.8**
19	b	**0.8**
20	c	**0.8**
21	b	**0.8**
22	a	**0.8**
23	d	**0.8**
24	d	**0.8**
	SECTION B	
25	c	**0.8**
26	a	**0.8**
27	d	**0.8**
28	c	**0.8**
29	b	**0.8**
30	c	**0.8**
31	d	**0.8**
32	a	**0.8**
33	a	**0.8**
34	d	**0.8**

35	b	**0.8**
36	d	**0.8**
37	d	**0.8**
38	b	**0.8**
39	a	**0.8**
40	d	**0.8**
41	a	**0.8**
42	d	**0.8**
43	a	**0.8**
44	b	**0.8**
45	b	**0.8**
46	c	**0.8**
47	c	**0.8**
48	b	**0.8**
SECTION C		
49	a	**0.8**
50	c	**0.8**
51	c	**0.8**
52	d	**0.8**
53	a	**0.8**
54	b	**0.8**
55	b	**0.8**
56	d	**0.8**
57	b	**0.8**
58	c	**0.8**
59	a	**0.8**
60	d	**0.8**

KENDRIYA VIDYALAYA SANGATHAN , ERNAKULAM REGION

TERM I EXAMINATION [PRACTICE TEST-3] 2021

CLASS X-SCIENCE

MM40 **TIME : 90 min**

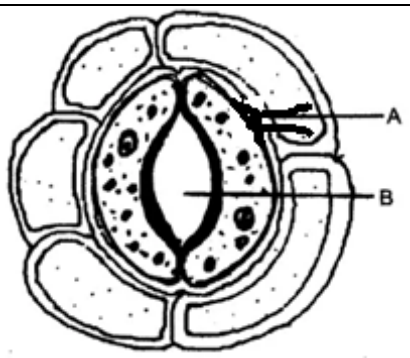
General Instructions:

1. The Question paper contains three sections.
2. Section A has 24 Questions. Attempt any 20 questions.
3. Section B has 24 questions. Attempt any 20 questions.
4. Section C has 12 questions. Attempt any 10 questions.
5. All questions carry equal marks.
6. There is no negative marking.

SECTION A

No:	Questions	Marks
1.	Name the reducing agent in the following reaction $CuO + H_2 \longrightarrow Cu + H_2O$ a. CuO b. H_2O c. H_2 d. Cu	**0.8**
2.	Lead nitrate when heated liberates a gas with brown fumes. Identify the gas. a. CO_2 b. O_2 c. PbO d. NO_2	**0.8**
3.	Dry hydrogen chloride gas does not turn dry blue litmus paper red. The reason being…… a. Dry HCl gas reacts with the blue litmus to produce salt. b. Dry HCl can turn red litmus blue. c. Only in aqueous solution can dry HCl produce Hydrogen ions to show acidic behaviour. d. Due to the basic nature of dry HCl the blue litmus paper does not turn red.	**0.8**
4.	The splitting of white light into its component colours is called….. a. Splitting b. Diffraction c. Refraction d. Dispersion	**0.8**

5.	The power of a lens is +1.6D. Identify the type of lens. a. Convex b. Concave c. Either convex or concave d. None of the above	**0.8**
6.	What happens to a ray of light when it travels from one medium to another medium having equal refractive indices? a. The ray bends towards the normal. b. The ray bends away from the normal. c. The ray passes without any deviation. d. The ray will be reflected back.	**0.8**
7.	What is the significance of + *ve* sign of magnification? a. Real image b. Virtual image c. It depends on the type of mirror. d. It depends on the type of lens.	**0.8**
8.	…….. is an example of a plant having parasitic mode of nutrition. a. Cuscuta b. Bryophyllum c. Pitcher plant d. Bread mould	**0.8**
9.	If salivary amylase is lacking in the saliva, which of the following events in the oral cavity will be affected? a. Proteins breaking down into amino acids. b. Starch breaking down into sugars. c. Fats breaking down into fatty acids and glycerol. d. Absorption of vitamins.	**0.8**
10.	Lack of oxygen in muscles often leads to cramps among athletes. These results due to a. Conversion of pyruvate to ethanol. b. Conversion of pyruvate to glucose. c. Conversion of glucose to pyruvate. d. Conversion of pyruvate to lactic acid.	**0.8**

11.	 Identify A and B a. Guard cell and stomatal pore b. Epidermal cell and stomatal pore c. Stomata and guard cell d. Stomata and subsidiary cells.	**0.8**
12.	Out of a goat and a tiger, which one will have a longer small intestine? Justify your answer. a. Tiger has longer intestine as it eats flesh of other animals. b. Goat has a longer small intestine to digest cellulose present in grass. c. Both tiger and goat have small intestines of the same size. d. The size of the small intestine depends on the size of the stomach.	**0.8**
13.	Bile does not contain any enzyme but it is essential for digestion. Why? a. Bile helps in providing acidic medium for proteins to be digested. b. Bile helps in providing alkaline medium and for emulsification of fats. c. Bile helps in converting starch int sugar. d. Bile helps in absorption of water needed for the body.	**0.8**
14.	The main function of ureter is a. Control the pressure of urine in the urinary bladder. b. Take urine from kidneys to the urinary bladder. c. Filter blood and form urine. d. Removal of urine stored in urinary bladder.	**0.8**
15.	Translocation is the term given for a. Transport of water through xylem. b. Transport of food prepared by leaves to all parts by phloem. c. Exchange of gases through stomata. d. Removal of excretory products in a plant.	**0.8**

16.	A metal X reacts with cold water and floats. Identify X a. Mg b. Zn c. Ca d. Fe	**0.8**
17.	On passing CO_2 gas in excess in aqueous solution of sodium carbonate, the milky colour disappears and the substance obtained is: a. NaOH b. $NaHCO_3$ c. Na_2CO_3. $10H_2O$. d. $Na_2CO_3H_2O$	**0.8**
18.	An inverted image can be seen in a convex mirror: a. under no circumstances b. when the object is very far from the mirror c. when the object is at a distance equal to the radius of curvature of the mirror d. when distance of the object from the mirror is equal to the focal length of the mirror	**0.8**
19.	The clear sky appears blue because: a. blue light gets absorbed in the atmosphere b. ultraviolet radiations are absorbed in the atmosphere c. violet and blue lights get scattered more than lights of all other colours by the atmosphere d. light of all other colours is scattered more than violet and blue colours by the atmosphere	**0.8**
20.	In case of a concave mirror, when the object is situated at the principal focus, the image formed is: a. real and inverted b. of infinite size c. lies at infinity d. all of these	**0.8**
21.	. One cannot see through the fog, because a. refractive index of the fog is very high b. light suffers total reflection at droplets. c. fog absorbs light. d. light is scattered by the droplets	**0.8**
22.	What are two properties that make a metal a GOOD choice to use as a wire in electronics? **a.** Conductivity, malleability **b.** Ductility, Conductivity	**0.8**

	c. Lustre, malleability **d.** Malleability, high density	
23.	Which property of metals is used for making bells and strings of musical instruments like Sitar and Violin? a. Sonorous b. Malleability c. Ductility d. Conductivity	**0.8**
24.	The refractive index of a medium is the ratio of speed of light in air/ vacuum to a. Speed of sound in medium b. Speed of light in medium c. Wave length of light d. None of the above	**0.8**
	SECTION B	

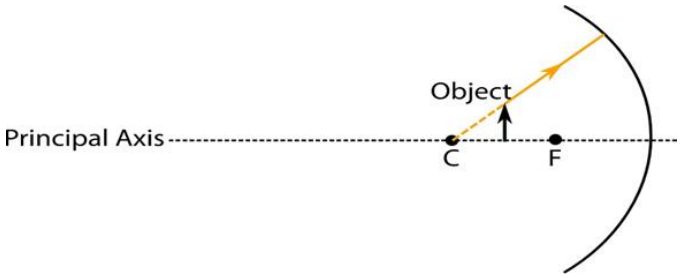
Two statements are given – one labelled **Assertion: (A)** and the other labelled **Reason: (R) .**

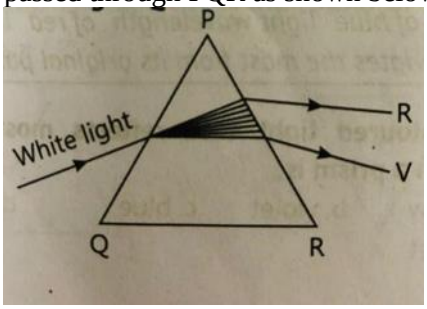
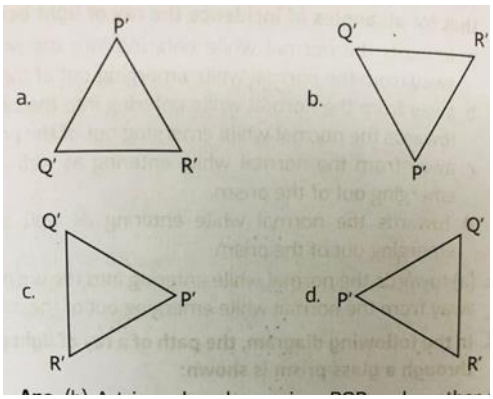
Select the correct answer to these questions from the codes given below:

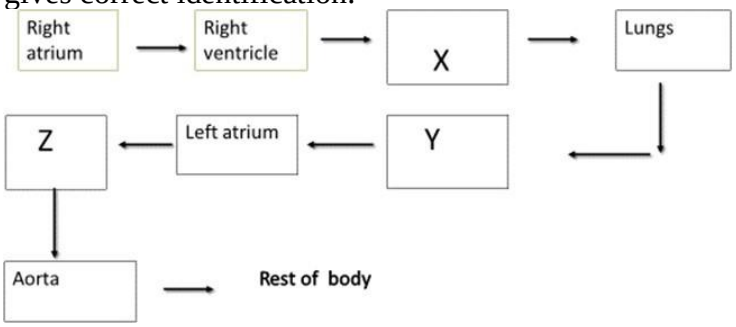
a) Both A and R are true, and R is correct explanation of assertion.
b) Both A and R are true, but R is not the correct explanation of the assertion.
c) A is true, but R is false.
d) A is false, but R is true.

25.	**Assertion (A)**: Silver chloride turns grey when exposed to sunlight. **Reason (R):** Decomposition of silver chloride in the presence of sunlight forms silver metal and chlorine gas.	**0.8**
26.	**Assertion (A):** In summer season, a milk man adds a very small amount of baking soda to fresh milk. **Reason (R):** Sodium hydrogen carbonate ($NaHCO_3$) neutralizes lactic acid formed in the milk.	**0.8**
27.	**Assertion (A):** The acid must always be added to water with constant stirring. **Reason (R**): Mixing of an acid with water decreases the concentration of H+ ions per unit volume.	**0.8**
28.	**Assertion(A):** The centre of curvature lies outside the reflecting surface of the mirror. **Reason (R**): The reflecting surface of a spherical mirror forms a part of a sphere. This sphere has a centre.	**0.8**

29.	**Assertion(A):** Light travels faster in glass than in air. **Reason (R):** Glass is denser than air.	**0.8**
30.	**Assertion (A):** The inner lining of the small intestine has numerous finger-like projections called villi. **Reason (R):** The villi increase the surface area for absorption.	**0.8**
31.	In which group of the organisms the food material is broken down outside the body? a. Mushroom, green plants, amoeba b. Yeast, mushroom, bread mould c. Paramecium, amoeba, cuscuta d. Cuscuta, lice, tapeworm	**0.8**
32.	Which of these reactions occur in Photosynthesis? a. Carbon dioxide is reduced and water is oxidized b. Water is reduced and carbon dioxide is oxidized c. carbon dioxide and water are oxidised d. carbon dioxide and water are reduced	**0.8**
33.	Choose the function of pancreatic juice from the following: a. Trypsin digests proteins and lipase digests carbohydrates b. Trypsin digests emulsified fats and lipase digests proteins c. Trypsin and lipase digest fats d. Trypsin digests proteins and lipase digests emulsified fats	**0.8**
34.	If the real image of a candle flame formed by a lens is three times the size of the flame and the distance between lens and image is 80 cm, at what distance should the candle be placed from the lens? a. -80cm b. -40 cm c. -40/3 cm d. -80/3 cm	**0.8**

35.	 While looking at the above diagram, Neena concluded the following- i. the image of the object will be a virtual one. ii. the reflected ray will travel along the same path as the incident ray but in opposite direction. iii. the image of the object will be inverted. iv. this is a concave mirror and hence the focal length will be negative. Which one of the above statements are **correct**? a. i and ii b. i and iii c. ii, iii and iv d. i, ii, iii and iv	**0.8**
36.	The refractive index of flint glass is 1.65 and that for alcohol is 1.36 with respect to air. What is the refractive index of the flint glass with respect to alcohol? a. 0.82 b. 1.21 c . 1.11 d . 1.01	**0.8**
37.	Carbohydrates in the plants are stored in the form of a. Glucose b. Starch c. Maltose d. Glycogen	**0.8**

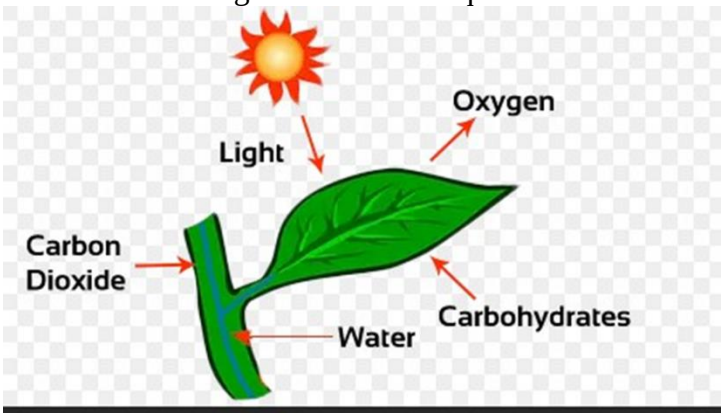
38.	Which of the following salts has no water of crystallization? a. Blue vitriol b. Washing soda c. Baking soda d. Gypsum	**0.8**
39.	The chemical formula of caustic potash is a. NaOH b. $Ca(OH)_2$ c. NH_4OH d. KOH	**0.8**
40.	Two identical prisms PQR & P'Q'R' are given. White light is passed through PQR as shown below  **Which of the following position of** P'Q'R' will again yield white light?  i)a ii)b iii)c iv)d	**0.8**

41.	Carefully study the diagram of the human circulatory system with labels X. Y, Z. Select the option which gives correct identification.  a. Pulmonary vein, pulmonary artery, left ventricle b. Pulmonary artery, pulmonary vein, left ventricle c. Pulmonary artery, vena cava, right ventricle d. Pulmonary vein, pulmonary artery, left ventricle	**0.8**
42.	Three beakers labelled as A, B and C each containing 25 ml of water were taken. A small amount of NaOH, anhydrous$CuSO_4$ and NaC1 were added to the beakers A, B and C respectively. It was observed that there was an increase in the temperature of the solutions contained in beakers A and B, whereas in case of beaker C, the temperature of the solution falls. Which one of the following statement (s) is/are correct? (i) In beakers A and B, exothermic process has occurred. (ii)In beakers A and B, endothermic process has occurred. (iii)In beaker C exothermic process has occurred. (iv)In beaker C endothermic process has occurred. (a) (i) only (b) (ii) only (c) (i) and (iv) (d) (ii) and (iii)	**0.8**

43.	Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved? (i)Displacement reaction (ii)Precipitation reaction (iii)Combination reaction (iv)Double displacement reaction (a) (i) only (b) (ii) only (c) (iv) only (d) (ii) and (iv)	**0.8**
44.	Which of the given properties is generally not shown by metals? A. Electrical conduction B. Sonorous in nature C. Dullness D. Ductility a. A b. B c. C d. D	**0.8**
45.	The composition of aqua-regia is A. Dil: HCl : Conc. HNO_3 = 3 : 1 B. Conc:HCl : Dil. HNO_3 = 3 : 1 C. Conc:.HCl : Conc. HNO_3 = 3 : 1 D. Dil:.HCl : Dil. HNO_3 = 3 : 1 a. A b. B c. C d. D	**0.8**

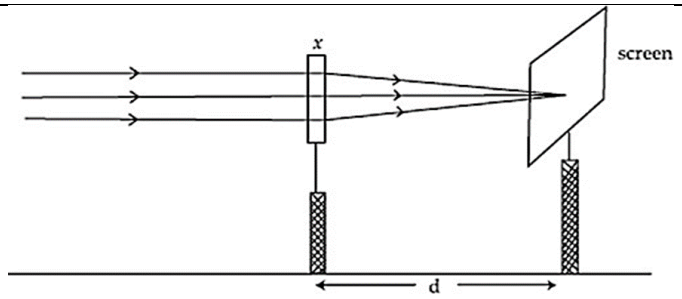
46.	Which of the given can undergo a chemical reaction? A. $MgSO_4 + Fe \longrightarrow$ B. $ZnSO_4 + Fe \longrightarrow$ C. $MgSO_4 + Pb \longrightarrow$ D. $CuSO_4 + Fe \longrightarrow$ a. A b. B c. C d. D	**0.8**
47.	In the given reaction, $Al_2O_3 + NaOH \rightarrow$ ……X…… $+ H_2O$ What is X ? a. $NaAlO_2$ b. Na_3Al c. Na_2O_3 d. $NaAl_2O_3$	**0.8**
48.	Bleaching powder is used as a disinfectant for water to: a. Make water tastier b. Remove all the dirt from water c. Make water germ-free d. Make water clear	**0.8**

SECTION C

I.	Read the following and answer the questions  Photosynthesis is the process by which plants, some bacteria and some protistans use the energy from sunlight to produce glucose from carbon dioxide and water. The process of photosynthesis is divided into two main parts – The first part is called the light dependent reaction when light energy is captured and finally stored into a chemical called ATP. The second part of the process happens when the ATP is used to make glucose also known as Calvin cycle'.	**Any 4**
49.	Oxygen is released during this process by **a.** Splitting of CO_2. b. Splitting of H_2O by radiant energy. c. By the action of chlorophyll. d. By the process of respiration.	**0.8**
50.	Identify the statement which is "False" a. Photosynthesis is an exothermic process. b. Photosynthesis occurs only during day time. c. Plants are called producers because of photosynthesis. d. Carbon dioxide is converted to carbohydrate.	**0.8**
51.	What controls the opening and closing of stomata? a. Massive amount of gaseous exchange. b. The action of solar energy.	**0.8**

	c. When guard cells swell or shrink due to the flow of water in or out of it. d. All of the above	
52.	The carbohydrate which is the product of Calvin cycle is a. Starch b. Glucose c. Cellulose d. Any of the above	**0.8**
53.	The formula for glucose is a. $C_{12}H_{22}O_{11}$ b. $C_6H_6O_{12}$ c. $C_6H_{12}O_6$ d. $C_{12}H_6O_{12}$	**0.8**
II. .	pH is quite useful to us in a number of ways in daily life. Some of its applications are: **Control of pH of the soil :** Plants need a specific pH range for proper growth. The soil may be acidic, basic or neutral depending upon the relative concentration of H^+ and OH^-. The pH of any soil can be determined by using pH paper. If the soil is too acidic, it can be corrected by adding lime to it. If the soil is too basic, it can be corrected by adding organic manure which contains acidic materials.	
54.	P is an aqueous solution of acid and Q is an aqueous solution of base. When these two are diluted separately, then a. pH of P increases while that of Q decreases till neutralisation. b. pH of P decreases while that of Q increases till neutralisation. c. pH of both P and Q decrease. d. pH of both P and Q increase.	**0.8**
55.	Which of the following acids is present in bee sting? a. Formic acid b. Acetic acid c. Citric acid d. Hydrochloric acid	**0.8**

56.	The pH of soil X is 7.5 while that of soil Y is 4.5. Which of the two soils, should be treated with powdered chalk to adjust its pH? (a) X only (b) Y only (c) Both X and Y (d) none of these	**0.8**
III.	A lens is a transparent optical object comprising of one or two curved surfaces that refract light. A lens might either diverge or converge rays of light falling on it, thus forming an image. The concept of refraction of light is used by the lens to form an image.	**Any 3**
57.	A convex lens has focal length of 10cm. At which of the following position should an object be placed so that this convex lens acts as a magnifying glass? a. 15cm b. 7cm c. 20cm d. 25cm	**0.8**
58.	What is the formula for magnification obtained with a lens? a. Ratio of height of image to height of object. b. Double the focal length c. Inverse of radius of curvature d. Ratio of height of object to height of image.	**0.8**
59.	A converging lens has focal length of 12cm. Where should the object be placed from the lens so that it forms an image of the same size at 24cm on the other side of the lens. a. 12cm b. 16cm c. 24cm d. Anywhere on the principal axis	**0.8**
60.	A student determined the focal length of a device _X by focusing a distant object on the screen as shown in the following diagram	**0.8**



Select the correct option.

a. Device X is a concave mirror and distance d is its focal length
b. Device X is a concave mirror and distance d is its radius of curvature
c. Device X is a convex lens and distance d is its radius of curvature
d. Device X is a convex lens and distance d is its focal length

ANSWER KEY
SECTION A

No:	Questions	Marks
1	c	**0.8**
2	d	**0.8**
3	c	**0.8**
4	d	**0.8**
5	a	**0.8**
6	c	**0.8**
7	b	**0.8**
8	a	**0.8**
9	b	**0.8**
10	d	**0.8**
11	a	**0.8**
12	b	**0.8**
13	b	**0.8**
14	b	**0.8**
15	b	**0.8**
16	c	**0.8**
17	b	**0.8**

18	a	**0.8**
19	c	**0.8**
20	d	**0.8**
21	d	**0.8**
22	b	**0.8**
23	a	**0.8**
24	b	**0.8**
	SECTION B	**0.8**
25	a	**0.8**
26	a	**0.8**
27	**b**	**0.8**
28	**a**	**0.8**
29	**d**	**0.8**
30	**a**	**0.8**
31	**b**	**0.8**
32	a	**0.8**
33	d	**0.8**
34	d	**0.8**
35	c	**0.8**
36	b	**0.8**
37	b	**0.8**
38	c	**0.8**
39	d	**0.8**
40	b	**0.8**
41	.b	**0.8**
42	c	**0.8**
43	d	**0.8**
44	c	**0.8**
45	c	**0.8**
46	d.	**0.8**
47	a	**0.8**
48	C	**0.8**

SECTION C		
49	b	**0.8**
50	a	**0.8**
51	c	**0.8**
52	b	**0.8**
53	c	**0.8**
54	a	**0.8**
55	a	**0.8**
56	b	**0.8**
57	**b**	**0.8**
58	a	**0.8**
59	c	**0.8**
60	d	**0.8**