Science Workbook

Class - X

State Council of Educational Research and Training
Govt. of Tripura

Science Work Book
Class - X

First Edition
September, 2021

Cover Design
Asoke Deb, Teacher

Type & Setting : SCERT, Agartala, Tripura.

Printed by : Satyajug Employees Co-operative Industrial Society Ltd.,
13 Prafulla Sarkar Street, Kolkata-72

Publisher :
State Council of Educational Research and Training
Government of Tripura.

রতন লাল নাথ
মন্ত্রী
শিক্ষা দপ্তর
ত্রিপুরা সরকার

বার্তা

শিক্ষার প্রকৃত বিকাশের জন্য, শিক্ষাকে যুগোপযোগী করে তোলার জন্য প্রয়োজন শিক্ষাসংক্রান্ত নিরন্তর গবেষণা। প্রয়োজন শিক্ষা সংশ্লিষ্ট সকলকে সময়ের সঙ্গে সঙ্গে প্রশিক্ষিত করা এবং প্রয়োজনীয় শিখন সামগ্রী, পাঠ্যক্রম ও পাঠ্যপুস্তকের বিকাশ সাধন করা। এস সি ই আর টি ত্রিপুরা রাজ্যের শিক্ষার বিকাশে এসব কাজ সুনামের সঙ্গে করে আসছে। শিক্ষার্থীর মানসিক, বৌদ্ধিক ও সামাজিক বিকাশের জন্য এস সি ই আর টি পাঠ্যক্রমকে আরো বিজ্ঞানসম্মত, নান্দনিক এবং কার্যকর করবার কাজ করে চলেছে। করা হচ্ছে সুনির্দিষ্ট পরিকল্পনার অধীনে।

এই পরিকল্পনার আওতায় পাঠ্যক্রম ও পাঠ্যপুস্তকের পাশাপাশি শিশুদের শিখন সক্ষমতা বৃদ্ধির জন্য তৈরি করা হয়েছে ওয়ার্ক বুক বা অনুশীলন পুস্তক। প্রসঙ্গত উল্লেখ্য, ছাত্র-ছাত্রীদের সমস্যার সমাধানকে সহজতর করার লক্ষ্যে এবং তাদের শিখনকে আরো সহজ ও সাবলীল করার জন্য রাজ্য সরকার একটি উদ্যোগ গ্রহণ করেছে, যার নাম 'প্রয়াস'। এই প্রকল্পের অধীনে এস সি ই আর টি এবং জেলা শিক্ষা আধিকারিকরা বিশিষ্ট শিক্ষকদের সহায়তা গ্রহণের মাধ্যমে প্রথম থেকে দ্বাদশ শ্রেণির ছাত্র-ছাত্রীদের জন্য ওয়ার্ক বুকগুলো সুচারুভাবে তৈরি করেছেন। ষষ্ঠ থেকে অষ্টম শ্রেণি পর্যন্ত বিজ্ঞান, গণিত, ইংরেজি, বাংলা ও সমাজবিদ্যার ওয়ার্ক বুক তৈরি হয়েছে। নবম দশম শ্রেণির জন্য হয়েছে গণিত, বিজ্ঞান, সমাজবিদ্যা, ইংরেজি ও বাংলা। একাদশ দ্বাদশ শ্রেণির ছাত্র-ছাত্রীদের জন্য ইংরেজি, বাংলা, হিসাবশাস্ত্র, পদার্থবিদ্যা, রসায়নবিদ্যা, অর্থনীতি এবং গণিত ইত্যাদি বিষয়ের জন্য তৈরি হয়েছে ওয়ার্ক বুক। এইসব ওয়ার্ক বুকের সাহায্যে ছাত্র-ছাত্রীরা জ্ঞানমূলক বিভিন্ন কার্য সম্পাদন করতে পারবে এবং তাদের চিন্তা প্রক্রিয়ার যে স্বাভাবিক ছন্দ রয়েছে, তাকে ব্যবহার করে বিভিন্ন সমস্যার সমাধান করতে পারবে। বাংলা ও ইংরেজি উভয় ভাষায় লিখিত এইসব অনুশীলন পুস্তক ছাত্র-ছাত্রীদের মধ্যে বিনামূল্যে বিতরণ করা হবে।

এই উদ্যোগে সকল শিক্ষার্থী অতিশয় উপকৃত হবে। আমার বিশ্বাস, আমাদের সকলের সক্রিয় এবং নিরলস অংশগ্রহণের মাধ্যমে ত্রিপুরার শিক্ষাজগতে একটি নতুন দিগন্তের উন্মেষ ঘটবে। ব্যক্তিগত ভাবে আমি চাই যথাযথ জ্ঞানের সঙ্গে সঙ্গে শিক্ষার্থীর সামগ্রিক বিকাশ ঘটুক এবং তার আলো রাজ্যের প্রতিটি কোণে ছড়িয়ে পড়ুক।

(রতন লাল নাথ)

CONTRIBUTORS & PROOF CHECKING

Chemistry

1. Saibal Roy, Teacher
2. Goutam Roy Barman, Teacher
3. Samar De, Teacher,
4. Biswajit Chowdhury, Teacher
5. Sila Gan Chaudhuri, Teacher

Physics

1. Subash Gan Choudhury, Teacher
2. Amal Chandra Nath, Teacher
3. Shirsendu Choudhury, Teacher
4. Jayati Bhattacharya, Teacher
5. Nabanita Chakraborty, Teacher

Biology

1. Dr. Satyapriya Roy, Teacher
2. Dr. Surajit Bhattacharya, Teacher
3. Kakali Majumder, Teacher
4. Bikash Choudhury, Teacher
5. Nilakshi Nag, Teacher

CONTENTS

Chapter 1

Chemical Reaction & Equation

Chapter at a glance :

1. In a chemical reaction reactants are in the left hand side and products are in the right hand side of the reaction

$$A + B \rightarrow C + D$$

Where A and B are reactants and C and D are products.

2. Chemical reaction need to be balanced otherwise law of conservation of mass will be violated.

3. In a chemical reaction the gaseous substances are represented by g or ↑ , precipitate by ↓ water Soluble substaces by (aq) and solid and liquid substances by (s) and (*l*) respectively on the right side of the reactants and products within first bracket.

4. Combination Reaction : In this type of reaction there are more than one reactants but only single product is formed.

example : $C(s) + O_2(g) \rightarrow CO_2(g)$.

5. Decomposition Reaction : Reactions in which there is only one reactant but more than one products are formed are known as decomposition reaction .

example : $CaCO_3(s) \longrightarrow CaO(s) + CO_2(g)$

Decompostion reaction are three types –

i) Thermal Decompostion : Reaction are carried out by heating.

example : $2Pb(NO_3)_2(s) \xrightarrow{heat} 2PbO(s) + 4NO_2(g) + O_2$

ii) **Photolytic Decomposition** : In this case reactions are carried out in presence of light

example : $2AgBr(s) \xrightarrow{sunlight} 2\,Ag(s) + Br_2(g)$.

iii) Electrolytic decomposition : When electricity is passed in aqueous solution or molten state of an electrolyte, chemical reaction occur in the electrodes through oxidation and reduction proceess.

$$2H_2O \text{ (acidic medium)} \longrightarrow 2H_2^{(g)} + O_2(g)$$

In this, case, 2 volume of Hydrogen is produced at cathode and 1 volume of oxygen is produced at anode.

6. Single displacement reaction : More reactive metal or non metal replaces comparatively less reactive metal or non metal from their compound. Single displacement reaction is an Redox reduction reaction.

$$\text{like } Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$$

7. Double-displacement reaction : Cations of two water soluble reacetant get exchanged to from product. The product may be soluble or insoluble, Double-displacement reaction is not an Redox reduction reaction.

i. $NaCl\ (aq) + AgNO_3\ (aq) \rightarrow AgCl(s) + NaNO_3(aq)$

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

In this case, No. (i) reacton an is an example of precipitation reaction and No ii) reaction is an example neutralisation reaction.

8. Oxidation : Releasing of electron is an oxidation reacton -

$$Na - e \rightarrow Na^+$$

In this case Na, release electron and gets oxidised. This is why Na is reducing agent. According to classical concept addition of oxygen or any electronegative element and displacement of hydrogen or any electro positive element is oxidation process.

9. Reduction : Gaining of electron is reduction.

$$Cl + e \rightarrow Cl^-$$

In this case chlorine accept electron and gets reduced. that is why 'Cl' is an oxidising agent. Again, according to classical concept, displacement of oxygen or other electronegative atom and addtion of hydrogen and another electro positive element is reduction.

10. Corrosion : In open air metal reacts with O_2, water vapour and loses its, shine. This is known as corrosion. For example rusting of iron. Galvanisation, tin plating and colouring of metal can reduce corrosion.

11. Rancidity : If oily food is kept in open atmosphere then oxygen oxidises the food slowly and taste is changed after oxidation and foul smell is obtained. This is known as rancidity.

BHA (Butylated hydroxy Anisole), BHT (Butylated hydroxy Toluene) and presence of nitrogen gas can prevent the rancidity.

A) Identify the correct answer in the following questons (MCQ)

1. Chemical reaction should be balanced otherwise –
   a) law of gravitation will be violeted.
   b) low of conservation of energy will be violeted
   c) law of conservation of mass will be violeted
   d) Newton's first law will be violeted

   Ans :

2. Which information is among the following is not correct in connection of the reaction-
   $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(l)$
   a) Hydrogen is a reducing agent
   b) Cupric oxide is a reducing agent
   c) Copper is reduced product
   d) the copper ion (Cu^{2+}) in cupric oxide accepts two electrons and gets reduced.

   Ans :

3. $x\ Pb(NO_3)_2(s) \rightarrow y\ PbO(s) + zNO_2(g) + O_2(g)$
   the arithmatic value of x, y and z are –
   a) 2, 2, 4
   (b) 2, 4, 2
   (c) 4, 2, 6
   (d) all are incorrect.

   Ans :

4. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + Heat$. This reaction is –
   i) endothermic reaction (ii) combination reaction (iii) Redox reaction
   (iv) unidirectional reaction.
   a) (i) & (iv)
   (b) only (ii)
   (c) (ii) & (iv)
   (d) (ii) & (iii)
   Ans :

5. When carbondioxide gas is passed through lime water it becomes turbid but on passing in excess amount the solution becomes clear. because

a) soluble calcium carbonate is formed

b) soluble calcium hydrogen carbonate is formed

c) when lime is added with water we get slaked lime

d) addition of lime in water produces large amount of heat.

Ans :

6. $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$ reaction is a –

i) displacement reaction

ii) blue colour solution becomes colour less.

iii) It is an oxidation reduction reaction

iv) Zinc is more reactive metal than copper.

a) only (i)

b) all informations are correct.

c) execpt No. (iii) all are correct

d) (i) and (iv)

Ans :

7. In presence of sunlight the white colour of AgCl becomes –

(a) Grey

(b) Yellow

(c) Red

(d) All are incorrect

Ans :

8. The ratio of volume of hydrogen and oxygen produced in electrolysis of water is –

(a) 1:2

(b) 2:1

(c) 1:1

(d) 1:8

Ans :

9. Which one of the following is not a chemical reaction -

a) Orange juice is added in milk

b) Heat is absorbed when ammonium chloride crystal is added in water.

c) a piece of coal is Burned

d) inhalation and exhalation

Ans :

10. When silver nitrate is added in sodium chloride solution white precipitate of silver chloride is formed. This reaction is -

a) double displacement reaction

b) oxidation and reduction reaction

c) precipitation reaction

d) both (a) and (c)

Ans :

11. Rancidity can be prevented by

a) adding anti-oxidant

b) packing of oily food in presence of nitrogen gas

c) (a) and (b) both

d) not a single one of the above

Ans :

12. When lime stone is added in hydrochloric acid solution bubbles are formed - the bubble is -

a) SO_2 gas

b) CO_2 gas

c) Cl_2 gas

d) H_2S gas

Ans :

13. Which of the following element form oxide to protect itself -

a) Aluminium

b) Copper

c) Silver

d) Iron

Ans :

14. What happens when iron dust is added in hydrochloric acid solution ? Indetify the correct answer-

a) Hydrogen gas and iron chloride is formed

b) chlorine gas and iron hydroxide is formed

c) no reaction takes place

d) salt of iron and water is formed

Ans :

15. Which one of the following is not a physical change-

a) A great extent of heat is evolved when sodium hydroxide is added in water

b) Crystallisation of ammonium chloride

c) melting of wax

d) photosynthesis

Ans :

16. Lead nitrate solution reacts with potassium iodide solution to form yellow coloured precipitate. The yellow coloured precipitate is -

a) Lead oxide

b) Lead Iodide

c) Lead Iodate

d) None of the above

Ans :

17. The colour of rust is -

a) Brown

b) Yellow

c) Grey

d) Black

Ans :

18. Which of the following reaction represents both double-decomposition and neutralisation reaction -

a) $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$

b) $Na_2O(aq) + 2HCl\ (aq) \rightarrow 2NaCl(aq) + H_2O(l)$

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

d) $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

Ans :

19. The products of the following reactions are-

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

a) $Zn(s) + CuSO_4(aq)$

b) $CuO(s) + ZnS(aq)$

c) $CuS(s) + ZnO\ (aq)$

d) reaction not possible

Ans :

20. When an element of bright brown colour is heated in air it turns to black colour. The black coloured compound is -

a) Silver oxide

b) Cupic oxide

c) Zinc oxide

d) Lead sulphide

Ans :

B) Fill in the Blanks : 1 Mark

1. Electron _____ is reduction process and _____ is oxidation process.
2. In a chemical reaction the substances in the left hand side are known as _____ and substances in the right hand side are known as _____.
3. In a balanced equation ____ numbers are equal on both sides.
4. Electrolysis is a ____ reaction.
5. $SO_2(g) + H_2S(g) \rightarrow S(s) + H_2O(l)$ in this reaction oxidised and reduced substances are ____ and ____.
6. When lead nitrate is heated in a dry test tube then yellow coloure _____ is produced.
7. Oxygen preparation reaction in a laboratory is ____ reaction.
8. Respiration is _____ reaction.
9. Every neutralisation reaction is ____ reaction.
10. In egg shell ____ subtance is present which reacts with HCl to form CO_2 gas.

C) The statements which are incorrect in the following write them correctly: 1 Mark

1. Double decomposition is a redox and reduction reaction.
   Ans :
2. Silver chloride is stored in a black bottle.
   Ans :
3. Decomposition reaction is opposite of combination reaction.
   Ans :
4. Corrosion of Aurum is possible.
   Ans :
5. Respiration is an endothermic process.
   Ans :
6. Matter cannot be created nor be destroyed.
   Ans :
7. Rust forms rapidly in dry air
   Ans :
8. Decomposition of food items can be stoped using air tight containers.
   Ans :
9. In a chemical reaction ↓ symbol is used in right side of gaseous substances.
   Ans :
10. Number of oxygen atom in one molecule of lead nitrate is 3.
    Ans :

D) Questins based on assertion and reason : 1 Mark

Intructionn : Assertion and reason are given side by side in the following questions numbered 1 to 10. Read the statement and write the correct answer.

a) Both assertion and reason are correct and reason is the correct explanation of the assertion.

b) Both assertion and reason are correct, but reason is not the correct explanation of the assertion.

c) Assertion is correct but reason is incorrect.

d) Assertion is incorrect but reason is correct.

1. Assertion : Iron transforms the blue colour of copper sulphate to green.

Reason : Iron, being more reactive metal than copper, displaces copper to form Ferrus Sulphate.

2. Assertion : $Zn(s) + H_2SO_4(aq) \rightarrow ZnSO_4(aq) + H_2(g)$ it is a displacement reaction.

Reason : Zinc reacts with oxygen to form zinc oxide.

3. Assertion : $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$ an oxidation reduction reaction.

Reason : MnO_2, Oxidises HCl to Cl and gets reduced.

4. Assertion : Photosynthesis is an exothermic reaction.

Reason : Photosynthesis takes place in presence of sunlight.

5. Assertion : The brown layer formed when iron is kept in open air is known as rust.

Reason : Rust forms over iron in presnece of water and air.

6. Assertion : Hydrogen chloride form when mixture of hydrogen and chlorine is kept in sunlight.

Reason : The reaction is a combination reaction.

7. Assertion : $2H_2S(g) + O_2(g) \rightarrow 2S(s) + 2H_2O\ (l)$ is not a redox reaction.

Reason : The reaction is a example of displacement reaction.

8. Assertion : Condensation of vapour is an endothermic process.

Reason : Condensation is a physical change.

9. Assertion : Sulphur dioxide gas turbids lime water.

Reason : Insoluble limestone is formed

10. Assertion : Natural gas burns in air to form carbon dioxide and water vapour.

Reason : Combustion is an oxidation process.

E) Answer in a Single word : 1 Mark

1. When a green coloured crystal is heated a gas with smell of burnt sulphur is obtained. What is the name of green crystal ?

Ans :

2. A metal is used in preparation of ornaments. When it is used for longtime a black coloured layer is formed over it. Name the black coloured compound.

Ans :

3. When calcium hydrogen carbonate is heated we get lime stone. What type of reaction is this ?

Ans :

4. When iron nails are added in blue colour copper sulphate solution what will be the new colour of the solution ?

Ans :

5. Name one anti oxidant .

Ans :

6. What is the formula of rust ?

Ans :

7. Name the metal which produces hydrogen gas with alkali ?

Ans :

8. When zinc metal is added in dilute sulphuric acid solution a gas evolves, Which burns with blue flame. What is the name of the gas ?

Ans :

9. When Magnessium ribbon is burnt in air a compound is formed which dissolves in water to form a gas with pungent smell. Name the compound.

Ans :

10. Molten $NaCl \xrightarrow{\text{electricity}} 2Na(s) + Cl_2(g)$ what type of reaction ?

Ans :

F) Very short questions : 2 Marks

1. What exchange takes place in double displacement reaction ?
2. What is photolytic decomposition Give example .
3. Define oxidation and reduction in respect of electronic theory .
4. Name two method to prevent rusting.
5. Why deflated packets of chips should not be purchased ?
6. What is precipitation reaction? Give example .
7. Balance the following equations –

a) $Al_2O_3 + HCl \rightarrow AlCl_3 + H_2O$

b) $P_4 + O_2 \rightarrow P_2O_5$

c) $Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO_2 + H_2O$

d) $PbS + H_2O_2 \rightarrow PbSO_4 + H_2O$

G) Long answer type question: 5 Marks

1. A metal nitrate 'A' when heated gives a yellow brown metal oxide, a brown coloured gas 'B' and a colourless gas 'C'. Aqueous solution of 'A' reacts with potasium iodide to form yellow coloured precipitate 'D'. Identify 'A', 'B', 'C', and 'D' what type of reaction is the formation of D.

2. (a) Define oxidising and reducing agent. Give example.

(b) A (hard solid substance) $\longrightarrow$ B + C

(used in floor) solid gas

Gas C turbids lime water and huge amount of heat is produced, identify A, B and C.

3. (a) M + $H_2O \rightarrow$ B + C(gas) + heat

The reaction takes place vigorously. The solution of B turns red litmus blue and the gas can be used in balloons. The metal M is used in Nuclear reactors as coolant. Identify M, B and C.

4.(a) Write two steps to prevent corrosion.

(b) Name two metal which are free from corrosion.

(c) Why small amount of acid is added in electrolysis of water ?

5. Write the name of the reaction below –

(a) Lead nitrate + Potassium iodide $\rightarrow$ lead iodide + potassium nitrate

(b) Calcium oxide + Water $\rightarrow$ Calcium hydroxide

(c) Chlorine + Sodium hydroxide $\rightarrow$ Sodium chloride + Sodium chlorate + Water

(d) Zinc + Sodium hydroxide $\rightarrow$ Sodium Zincate + Hydrogen

(e) Sodium Carbonate + Hydro chloric acid $\rightarrow$ Sodium chloride + Carbon dioxide + water

H) Comprehension Type: 3 Marks

1. Oxidation and reduction takes place simultaneously, that is why oxidation and reduction reaction is made of two half reaction, one is oxidation reaction the other is reduction reaction. Oxidation and reduction of atom, molecule or ions can happen by releasing or accepting electron. The substance that releases electrons gets oxidised and acts as reducing agent. Similarly the substance which accepts electrons gets reduced and acts as oxidising agent.

1. In which on the following H_2O act as oxidising agent ?

(a) $2FeCl_2 + 2HCl + H_2O_2 \rightarrow 2FeCl_3 + 2H_2O$

(b) $2HI + H_2O_2 \rightarrow I_2 + 2H_2O$

(c) $H_2SO_3 + H_2O_2 \rightarrow H_2SO_4 + H_2O$

(d) None of the above.

ii) $P_4 + 5O_2 \rightarrow 2P_2O_5$

(a) In this case P_4, gets reduced to P_2O_5

(b) O_2, gets oxidised to P_2O_5

(c) P_2O_5 acts as both oxidising and reducing agent

(d) P_4 is oxidising agent

iii) $Cu(s) + 2Ag\,NO_3\,(aq) \rightarrow Cu\,(NO_3)_2(aq) + 2Ag \downarrow$

(a) Cu, gets oxidised by releasing two electrons

(b) Ag^+ accepts one electron and gets oxidised

(c) Cu, gets oxidised by releasing one electron

(d) $2Ag^+$ gets oxidised by accepting two electron

D. Identify the correct answer –

In presence of catalyst potassium chlorate gets reduced and produces oxygen

the reaction is $2KClO_3\,(s) \rightarrow 2KCl(s) + 3O_2(g)$

i) (a) 2 mol $KClO_3$, gives 3 mol oxygen

(b) 1 mol $KClO_3$, gives 1 mol oxygen

(c) 3 mol oxygen can be obtained from 1 mol $KClO_3$

(d) 300g oxygen can be obtained from 200g $KClO_3$

ii) How many mol of $KClO_3$ is required to prepare 2.4 mol of oxygen

(a) 2 mol (b) 3 mol (c) 1.6 mol (d) 1.5 mol

iii) Identify the correct answer -

a) the reaction is electric decomposition reaction

b) the reaction is decomposition under light type

c) the rate of reaction increasses in presence of catalyst

d) $KClO_3$ is a liquid substance

Chapter 2

Acids, Bases and Salts

Chapter at a glance :

1. The chemical compound which can produce Hydrogen (H^+) or Hydronium (H_3O^+) ion as a cation in aqueous solution is called acid.

$$HCl \rightleftharpoons H^+ + Cl^-$$

$$H^+ + H_2O \rightarrow H_3O^+$$

Hydrogen ion (H^+) reacts with water to produce hydronium ion(H_3O^+).

2. Acid can be classified on the basis of the following categories.

a) Accroding to concentration of (H^+) ion

b) According to basicity

c) On the basis of concentration of acid

d) On the basis of source

e) On the basis of molecular composition

3. Acids which are completely dissociated in water and produce large No. of Hydrogen ion (H^+) or Hydronium ion (H_3O^+) they are called strong acid. Such as HCl, H_2SO_4, HNO_3.

But those acids which are partially dissociated in water & produces less No. of hydrogen (H^+)ions or hydronium (H_3O^+)ions are called weak acids. Such as HCOOH, CH_3COOH, H_2CO_3 etc.

4. The number of replaceble Hydrogen atom or number of H+ ion produced by each acid molcule in water solution is the basicity of that acid.

5. Acids can be classified into two types depending upon the amount of water present in it.

If the amount of water is less, then it is known as concentrated acid and if the amount of water is more then it will be diluted acid.

6. If the acid is obtained from plants and animals then it is organic acid and if it is obtained from minerals then it is inorganic acid. Such as, HCOOH, is a organic acid & H_2SO_4 is a inorganic acid.

7. Acid is sour in taste, it is soluble in water & its water solution can conduct electricity. It can change the colour of blue litmus to red. Acids react with base to produce salt and water. This reaction is called neutralisation reaction.

$$HCl + NaOH \rightarrow NaCl + H_2O$$

8. Hydracids do not contain oxygen. (Hydracids contain hydrogen along with other non metal except oxygen) such as HCl, HBr, HI etc. If oxygen is present along with Hydrogen in the acid then it is oxyacid. Such as HNO_3, H_2SO_4

9. Acids can be prepared in many ways. Such as, by the combination of non metals, by dissolving non metallic oxide in water, by substitution reaction of salt of more volatile acid to less volatile acid etc.

10. Acid can take part in reaction with different metal & metallic oxide in following ways

Metal + Acid (Dil) $\rightarrow$ Salt + Hydrogen

Metallic oxide + Acid $\rightarrow$ Salt + Water

Mettalic carbonate + Acid $\rightarrow$ Salt + Water + Carbondi oxide

Metallic hydrogen carbonate + Acid $\rightarrow$ Salt + Water + Carbondi oxide

11. Metallic oxides & Hydroxides are called base. Such as Na_2O, MgO, NaOH, $Al(OH)_3$, $Zn(OH)_2$ etc. But water solubale bases are called alkali. Like -NaOH, KOH, NH_4OH etc. Therefore all alkalis are bases but all bases are not alkalis.

12. Alkali can produce hydroxyl (OH^-)as a anion in aqueous solution. Depending upon the concentration of OH^- ion in aqueous solution alkali can be divided into strong alkali & week alkali. Alkalis those can produce large No. of OH^- ions in water solution they are strong alkalis. Like NaOH, KOH etc. The alkalis which can produce less No. of OH^- ions in aqueous solution, they are weak alkalis. Such as NH_4OH, $Mg(OH)_2$, $Al(OH)_3$

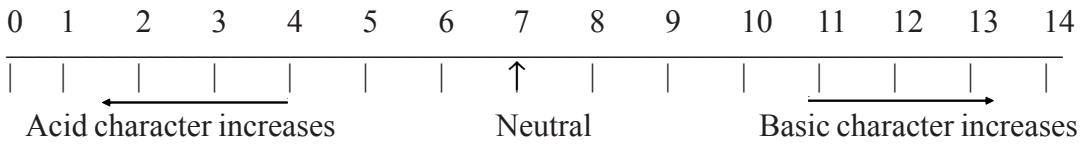
13. The numbert of OH– ions produced by each alkali molecule in aquous solution is the acidity of that alkali. Depending upon the acidity alkalis can be classified as monoacidic, diacidic & tri acidic alkali. Such as, NaOH (monoacidic), $Ca(OH)_2$ (diacidic).

14. Alkalis are bitter in taste, slippery like soap and can change the colour of red litmus to blue and colourless phenopthalien solution to pink colour.

15. Bases can be prepared in many ways. Such (i) as by oxidation of metal, (ii) by the reaction of water and active metal, (iii) by dissolving the metallic oxide in water, and (iv) by heating metallic carbonate, metallic nitrate etc. NH_4OH is produced when NH_3 gas is passed through the water.

16. Amphoteric metals react with acids as well as bases to pruduce hydrogen gas, salt & water with amphoteric oxide. Moreover in reaction with CO_2 bases can produce carbonate salt and with metallic salt solution insoluable metallic hydroxide are formed.

17. To judge the strength of acid & base pH scale is used. pH is the negative logarithim of molar concentration of $[H^+]$ or $[H_3O^+]$ that is pH = –log$[H^+]$ or pH = –log $[H_3O^+]$. Generally a paper saturated with universal indicator is used to detect the pH. Range of pH scale 0 (strong acid) to 14 (strong base)



18. The pH plays very important role in our everyday life, like growth in plant, life process of animals (especially aquatic animals), the digestion of food in our digestive system, tooth decay, protection in plants and animals through chemical warfare, In all these pH has very important influence.

19. Indicator is organic weak acid or weak base which indicate the end point of a neutralisation reaction by changing its colour. Example of indicators are litmus paper, phenolphalein, methyl orange etc.

Name of indicator	Change in colour	
	Acidic Solution	Basic Solution
Litmus	Blue to red	Red to blue
Methyl orange	Orange to red	Orange to yellow
Phenol pthalien	Colourless	Pink

20. Salt is an ionic compound which is formed by metallic ion or ammonium ion replacing partially or completely the hydrogen atom of an acid.

Acid + base $\longrightarrow$ Salt + Water

21. Salts can be classified in different groups. Some example of each type of salts are given below

a) Acidic Salt : $NaHSO_4$, Na_2HPO_4

b) Normal salt / neutral salt : NaCl, $NaNO_3$, K_2CO_3

c) Basic Salt : eg $Cu(OH)NO_3$, Cu(OH)Cl

d) Double Salt : eg $K_2SO_4.Al_2(SO_4)_3.24H_2O$ (Pottash alumn)

$(NH_4)_2SO_4.FeSO_4.6H_2O$ (Mohr's salt)

e) Mixed slat : eg $NaHCO_3$, Ca(OCl)Cl

f) Complex salt : eg $K_2[HgI_4]$, Na_2ZnO_2

22. Sodium chloride is known as common salt or table salt. Saturated solution of sodium chloride is known as brine Solution.

When electricity is passed through the brine solution, NaOH is formed which is known as chlore alkali process.

$2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$

23. Sodium chloride is used as raw materials to produce sodium hydroxide, baking soda, washing soda etc.

24. Water of crystallisation is a fixed number of water molecules present in formula unit mass of the salt. In one formula unit mass of hydrated copper sulphate there are five water molecule which is water of crystallisation. As a result chemical formula of it is $CuSO_4.5H_2O$ and another example is washing soda $Na_2CO_3.10H_2O$

Type-1 1 Mark

A) Write the correct answer from each of the following question **(MCQ)**

1. Which one is an Acid salt among the following

   a) K_2SO_4

   b) $NaHSO_4$

   c) NaCl

   d) KCl

   Ans :

2. Example of a basic salt –

   a) $Cu(OH)NO_3$

   b) Na_2HPO_4

   c) NaCl

   d) $NaKCO_3$

   Ans :

3. Name the element which must be present in all acids among the following

   a) Oxygen

   (b) Hydrogen

   (c) Nitrogen

   (d) Carbon

   Ans :

4. Which one is oxyacid

a) HCl

(b) HI

(c) HF

(d) HNO_3

Ans :

5. Phosphorous acid is a –

a) Strong dibasic acid

b) Weak di basic acid

c) Stong di basic acid

d) Strong tri basic acid

Ans :

6. Anhydride of sulphuric acid is

a) SO_2

b) SO_3

c) H_2SO_3

d) None of these

Ans :

7. Name the gas evolved when metal reacts with acid

(a) O_2

(b) N_2

(c) H_2

(d) CO_2

Ans :

8. pH value of two solutions A & B are 1 & 5 respectively. Among the follwoing correct statement is

(a) Solution A is less acidic than solution B

(b) Solution B is less acidic than solution A

(c) Solution A is less acidic than solution B

(d) Both the solution have same acid strength

Ans :

9. Which gas is obtained when ammonium salt & alkali react to each other in the following

a) H_2

b) NH_3

c) N_2

d) O_2

Ans :

10. Which gas is released during the chemical reaction of an acid & carbonate salt

a) O_2

b) N_2

c) H_2

d) CO_2

Ans :

11. Which one is the double salt -

a) NaCl

b) $(NH_4)_2SO_4.FeSO_4.6H_2O$

c) Ca(OCl)Cl

d) $NaHCO_3$

Ans :

12. Colour of the phenolphthalein in acid solution is

a) Red

b) Orange

c) Colourless

d) Blue

Ans :

13. Acid present in the Lemon is

a) Acetic acid

b) Citric acid

c) Formic acid

d) Tartaric acid

Ans :

14. Among the following the mineral acid is

a) HCl

b) HCOOH

c) CH_3COOH

d) $(COOH)_2$

Ans :

15. Which one is an alkali

a) $Al(OH)_3$

b) $Pb(OH)_2$

c) $Zn(OH)_2$

d) $Ca(OH)_2$

Ans :

16. Among the following which chemical compound is used during indigestion

a) NaOH

b) $Mg(OH)_2$

c) HCl

d) HCOOH

Ans :

17. Chemical formula of bleaching powder is

a) Ca(OCl)Cl

b) Ca(OOCl)Cl

c) $Ca(OCl)_2$

d) CaO_2Cl_2

Ans :

18. pH value of pure water is –

a) 6.8

b) 7.0

c) 8.2

d) 1.0

19. What is the change of colour when hydrated copper sulphate is heated

a) Blue to white

b) White to blue

c) White to red

d) No colour change

Ans :

20. pH value of human blood

a) 7.0

b) 7.2

c) 7.4

d) 6.7

Ans :

21. Chemical formula of baking soda is

a) Na_2CO_3

b) $NaHCO_3$

c) NaCl

d) Na_2SO_4

Ans :

22. Name the compound which is obtained on heating plaster of paris

a) Na_2CO_3

b) $CaCO_3$

c) $CaSO_4.2H_2O$

d) $CaSO_4$

Ans :

23. Name the gas obtained by the reaction of blcaching power & water

a) Cl_2

b) O_2

c) H_2

d) CO_2

Ans :

24. Name the acid which is present in the sting of red ant.

a) Formic acid

b) Acetic acid

c) Oxalic acid

d) Citric acid

Ans :

25. Chemical formula of table salt

a) KCl

b) CuCl

c) NaCl

d) LiCl

Ans :

B) Fill in the blanks : 1 Mark

1. Ammonium hydroxide is a _____ alkali
2. Orange colour of methyl orange solution changes into yellow in _____ solution.
3. Alum is a _____ salt.
4. The sodium compound _____ is used for softening the hard water.
5. _____ Acid is present in Tomato.
6. In strong acid solution colour of the universal indicator is ____
7. Formula of plaster of paris is _____
8. Bleaching powder when added to dil acid solution,_____ gas is produced
9. _____ & _____ are formed by the reaction of acid & base.
10. _____ compound on heating gives sodium carbonate.
11. Acidity of $Al(OH)_3$ is _____
12. Acetic acid is a _____ acid.
13. In determination of pH, concentration of H^+ ion is expressed in _____ unit.

14. The solutions which have high percentage of acid and low percentage of water per unit volume are called _____ acids.

15. All bases are not alkali but all alkalis are _____

16. The acids which can produce large no of H^+ ions in aqueous solution are called _____ acids

17. Taste of acid is _____

18. Acids obtained from minerals are known as ____ acid.

19. Soap is a _____.

C) Correct the wrong statements : 1 Mark

1. Acetic acid is a tri basic acid.
   Ans :
2. pH of pure water is 7
   Ans :
3. Water soluble bases are alkali
   Ans :
4. Non metals can-react with both dilute as well as concentrated acids.
   Ans :
5. Sodium chloride is a double salt
   Ans :
6. Dilute hydrochloric acid is a weak acid.
   Ans :
7. Indicators are strong organic acids or bases.
   Ans :
8. Chemical name of plaster of paris is Calcium sulphate dihydrate
   Ans :
9. Acetic acid is present in vinegar
   Ans :
10. Sodium carbonate decahydrate is used for washing the clothes

D) Assertion & Reason : 1 Mark

Instruction : In the following (1 to 10) each of the questions contain two statements. one is assertion & another is reason. Each of these questions has four alternative choices, one of which is the correct answer. You have to select the correct answer.

a) Assertion & Reason both are correct & reason is the proper explanation of assertion.

b) Assertion & Reason both are correct but reason is not the proper exaplanation of assertion.

c) Assertion is true & reason is not correct.

d) Assertion is wrong but reason is true.

1. Assertion : Sulphuric acid is a dibasic acid.

Reason : There are two replaceable hydrogen atom in sulphuric acid.

Ans :

2. Assertion : Ferric chloride is a neutral salt but its aqueous solution is acidic.

Reason : pH value of the Ferric chloride solution is less then 7.

Ans :

3. Assertion : Bleaching powder is used to sterilise the water .

Reason : Bleaching powder has bleaching property.

Ans :

4. Assertion : Sodium hydroxide is produced by the electroysis of aqueous solution of sodium chloride.

Reason : Sodium hydroxide is a weak alkali.

Ans :

5. Assertion : Acetic acid can not act as acid in benzene solution.

Reason : Benzene cann't accept the proton.

Ans :

6. Assertion : Acetic acid is present in vinegar.

Reason : Acetic acid is an organic acid .

Ans :

7. Assertion : Hydrochloric acid is stronger than formic acid.

Reason : Hydrochloric acid is present in our stomach.

Ans :

8. Assertion : : PH value of sodium accetate solution is more than 7

Reason : Sodium acetate is formed by the action of strong base & weak acid.

Ans :

9. Assertion : : All alkalis are bases but all bases are not alkali.

Reason : Carbon di oxide is a baisc oxide.

Ans :

10. Assertion : : Zinc oxide is an amphoteric oxide .

Reason : Zinc oxide can produce salt & water with acid as well as base.

Ans :

E) Answer in one word : 1 Mark

1. Name one weak mineral acid.

Ans :

2. Name one oxidising mineral acid.

Ans :

3. Name the gas which is obtained by the action on active metal & dilute acid.

Ans :

4. Name an indicator which is colourless in acid solution.

Ans :

5. What is the name of the positively charged ion when nitric acid is added in the water ?

Ans :

6. Name the acid which is present in the sting of red ant ?

Ans :

7. Name a compound which can sterilise the water ?

Ans :

8. What is the formula of plaster of paris ?

Ans :

9. What is the chemical name of bleaching powder ?

Ans :

10. Name an amphoteric oxide .

Ans.

11. What is the basicity of H_3PO_3 ?

Ans :

12. Name an organic acid.

Ans :

13. Whether H_2CO_3 is weak or strong acid ?

Ans :

14. Name a tri basic acid.

Ans :

15. Whether aqueous solution of an acid can conduct electricity ?

Ans :

16. Name a base which is not an alkali ?

Ans :

17. Name the acid which is present in the red ant ?

Ans :

18. Name the acid which is present in lemon ?

Ans :

F) Questions of very shrot answer type : 1 Mark

1. Why antacid is used in indigestion ?
2. What is olfactory indicaton ?
3. Give the example of a neutralisation reaction .
4. Why is white layer formed on lime water when exposed to air ?
5. Why distilled water can't conduct electricity ?
6. How is the concentration of H_3O^+/OH^- ions affected, when acids or bases are added to water?
7. What is universal indicator ?

8. What is acid rain ?

9. What is sea salt ?

10. What effect does the concentration of H^+ ions have on the nature of the solution ?

11. Why is bleaching powder added in the drinking water ?

12. What happenes when washing soda is strongly heated ?

13. Why temperature should be controlled during the preparation of plaster of paris ?

14. What is water of crystallisation ?

G) Answer the following questions : 2 Marks

1. Why should curd not be kept in coper container ?

2. Why does aqueous solution of acid can conduct electricity ?

3. Which one is stronger acid & why among dil HCl & conc. CH_3COOH ?

4. Write down two differences between mineral acid & organic acid ?

5. Though there are four hydrogen atoms in acetic acid it is monobasic acid. Why ?

6. Write down the definition of acid accoridng to Arrhenious concept ?

7. Define neutralisatoin reactoin. Give one example.

8. Complete the following equations and balance :

(a) $NaOH + HCl \rightarrow \_\_\_ + H_2O$

(b) $Ca(OH)_2 + \_\_\_ \rightarrow CaOCl_2 + \_\_\_\_$

(c) $NaCl + H_2O + CO_2 + \_\_\_\_ \rightarrow NH_4Cl + \_\_\_\_$

(d) $\_\_\_\_ \rightarrow Na_2CO_3 + H_2O + \_\_\_\_\_$

(e) $Al + NaOH + H_2O \rightarrow \_\_\_\_ + \_\_\_\_$

(f) $Ca(OH)_2 + CO_2 \rightarrow \_\_\_\_\_ + \_\_\_\_$

(g) $NH_4Cl + NaOH \rightarrow \_\_\_\_\_ + \_\_\_\_\_$

9. What is pH of a solution ?

10. What is acid salt ? Give the example.

11. On adding water in plaster of paris it becomes hard. Why ?

12. What is baking powder ? Mention its use.

13. What is indicator ? Give an example.

14. Name two olfactory indicator ?

H) Long answer type question : 3 Marks

1. Write the properties of acid.

2. What is base ? All bases are not alkalis but all alkalis are bases.

3. What happens during the following reactions.

   (a) When CO_2 gas is passed through the clear lime water.

   (b) A piece of Zn is dropped in dilute HCl solution.

4. If we touch nettle plant accidently then what is the remedy ?

5. There are three solutions A, B, C, pH value of these three solution are 2, 6 & 9 respectively. Answer the questions below :

   (a) Which are acidic solution & which one is basic solution?

   (b) Which one of them is srtong acid ?

   (c) How can you increase the pH value of solution A?

6. Write the definition of the following salt with example.

   (a) Basic salt. (b) Double salt.

7. What do you mean by pH scale. Write down the importance of pH in our daily life.

8. Why tooth decay occur due to change in pH?

9. Write the name & formula of three chemicals that can be prepared from common salt.

10. Write the formula of plaster of paris & write its two uses.

11. Write the formula of washing soda & write its two uses.

12. Write the equation involved for preparation of bleaching power in laboratory. Write its two uses.

13. While diluting acid, its is adviced to add acid to the water & not water to acid. Why ?

14. Why should curd or sour food items not be kept in copper vessels ? In this case what type of vessel would you suggest to use ?

15. Explain the preparation of NaOH by chlor alkali process.

I) Comprehension Type : 3 Marks

1. A compound of sodium (X) is a white powder. It is a coustituent of baking powder and is used as antacid. When the compound X is heated, it produces an anhydrous compound Y. If saturated solution of Y is recrystallised, hydrated crystal of Y is obtained. This hydrated crstal(z) on exposure to air loses water of crystallisation. This process is called efflorescence. Aqueous solution of this compound(z) is alkaline.

i) Compound Y is

(a) $NaHCO_3$

(b) Na_2CO_3

(c) $Na_2CO_3.10H_2O$

(d) NaCl

ii) The pH of aqueous solutions of Y is

(a) pH<7

(b) pH>7

(c) pH = 7

(d) pH= 6–7

iii) The compound X is

(a) acidic salt

(b) basic salt

(c) neutral salt

(d) mixed salt.

Chapter-3

Metal & Nonmetals

Chapter at a glance :

1. Till date, existance of 118 elements are known, out of these 22 are non-metals.
2. Metals have one, two or three valence electrons. But there are some elements with four valence electrons which are considered as metals. For example Tin (Sn) and Lead (Pb).
3. Generally metals lose one or more electrons to acquire positive charge.
   For example : M (metal) - ne ... M^{n+}
4. Metals are good conductors of heat and electricity. They are malleable and lustrous. Metals can be drawn into thin wires. Thermal conductivity of lead is very poor.
5. Aluminium is the most abundant metal on earth's crust.
6. Most of the metals lose their shiny appearance when they are exposed to air, as they react with the components of air. Metals when react with oxygen, they produce basic oxides, Though Zn and Al form amphoteric oxides.
7. Metal oxides are usually insoluble in water. Some metal oxides dissolve in water to produce hydroxides and are known as alkalis.
8. Metals react with water to form metal hydroxides or metal oxides and release hydrogen gas.
9. Metals react with dil. H_2SO_4 and dil HCl to produce salt and hydrogen gas. Exception : Cu, Hg, Ag, Au, Pt.
10. Aqua-regia is the mixture of three volume of conc. HCl and one volume of conc. HNO_3. Aqua-regia can dissolve the noble metals like Au&Pt.
11. Non-metals do not conduct heat & electricity. Exception - Graphite.
12. Non-metals are brittle.

13. Metals have 1, 2, 3 valence electrons have valency equal to its number of valence electrons. Non-metals have 4, 5, 6, 7 or 8 electrons in their valence shell. But noble gases are also non-metals. Their valency = 8 number of valence electrons.
14. Non-metals generally gain electrons and acquire negative charge.
    X (Non-metal) + ne $\rightarrow X^{n-}$
15. Oxygen is the most abundant non-metal on earth's crust.
16. Non-metals do not react with water or steam.
17. Non-metals do not react with dilute acids to produce hydrogen gas.
18. Ionic compounds are formed by transfer of electrons from metals to non-metals. For example : NaCl, K_2O, CaF_2 etc.
19. Non-metals combine together through sharing of electrons to from covalent compounds.
    Eg. : N_2, O_2, NH_3, CH_4 etc.
20. The compounds of metals which are found on the earth's crust are called minerals. Eg - Al_2O_3, $2H_2O$ (bauxite), FeS_2 (Iron Pyrites).
21. The minerals from which metals can be extracted on a large scale profitably are called ores.
    Eg - Haematite (Fe_2O_3).
22. The ores are concentrated by removing the unwanted impurities (gangue) from the ore.
23. Concentrated ore can be converted to metal oxide by calcination or Roasting.
24. The metal oxide is then reduced to get the metal, by either of the processes
    (i) Electrolytic reduction (ii) Carbon reduction (iii) Self reduction.
25. Electrolytic refining method is generally used to purify Cu, Ag, etc.
26. Alloys are homogeneous mixutre.

A) Select the correct answer for each of the following Questions. (MCQs): 1 Mark

1. The liquid metal (at room temperature) is __
   a. Sodium
   b. Gallium
   c. Megnesium
   d. Titanium

   Ans :

2. The correct order of reactivity of metals is __
   a) Na > K > Ca > Mg
   b) K > Na > Ca > Mg
   c) Ca > K > Na > Mg
   d) Na > Mg > K > Ca

   Ans :

3. The Most dense metal is __
   a) Iron
   b) Nickel
   c) Osmium
   d) Diamond.

   Ans :

4. Which of the following is most electrovalent compound __
   a) $SiCl_4$
   b) NaF
   c) ZnO
   d) CH_4

Ans :

5. The solid non-metal is
   a) Bromine
   b) Iodine
   c) Fluorine
   d) Oxygen

Ans :

6. Which reaction indicates calcination?

Reactions are :

a) $ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$

b) $ZnO + C \xrightarrow{\Delta} Zn + CO$

c) $2PbS + 3O_2 \xrightarrow{\Delta} 2PbO + 2SO_2$

d) $Al_2O_3 . 2H_2O \xrightarrow{\Delta} Al_2O_3 + 2H_2O$

Ans :

7. Three breakers A,B,C contains $ZnSO_4$, $AgNO_3$, $FeSO_4$ solutions respectively. A piece of copper is added in all these solutions. Solution of which beaker will become blue?

a) Beaker A,

c) Beaker B

c) Beaker C

d) All the three.

Ans :

8. Which is the Oxide ore?

a) Bauxite

b) Cuprite

c) Haematite

d) All of the above.

Ans :

9. Which of the following elements react with oxygen to form basic oxide?

a) Chlorine

b) Sulphur

c) Phosphorus

d) Megnesium

Ans :

10. The colour of basic copper carbonate is __

a) blue

c) yellow

c) red

d) green.

Ans :

11. An element X forms X^{2+} ion and another element y forms y^{2-} ion. The formula of the compound formed by X and Y is __

a) x_2y

b) xy

c) x_2y_3

d) yx

Ans :

12. The acid formed by reaction of SO_2 with water is __

a) Sulphurous acid

b) Sulphuric acid

c) both a & b

d) None of the above.

Ans :

13. Which oxide ore cannot be reduced by carbon reduction process __

a) ZnO (b) Al_2O_3 (c) FeO (d) PbO

Ans :

14. Which of the following ores are concentrated by froth floatation process?

a) ZnS (b) Al_3O_4. $2H_2O$ (c) Fe_2O_3 (d) $ZnCO_3$

Ans :

15. Flux is used to remove __

a) basic impurities

b) acidic impurities

c) all types of impurities

d) both acidic and basic impurities.

Ans :

16. Which of the following ores contain both iron and copper?

a) Cuprite

b) Chalcocite

c) Copper Pyritis

d) Malachite

Ans :

17. The percentage of Silver in German Silver alloy is __

a) 60%

b) 20%

c) 30%

d) 0%

Ans :

18. Which alloy is used to manufacture aeroplane parts ?

a) Duralumin

b) Brass

c) Gun metal

d) Bell metal

Ans. :

19. The components of Aqua regia are –

a) Three volume of dil HCl and one volume of conc. HNO_3

b) Three volume of conc. HCl and one volume of dil HNO_3

c) Three volume of conc. HCl and one volume of conc. HNO_3

d) Three volume of dil HCl and one volume of dil HNO_3

Ans :

20. Electronic configuration of three elements X,Y,Z are –

X–2, 8

Y– 2, 8, 6

Z – 2, 8, 1

Which of the following statement 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.

Ans :

B. Fill in the gaps : 1 Mark

1. The metal which is the best conductor of electricity is _____
2. The metal which can displace hydrogen gas from very dil nitric acid is _____
3. The non-metal _____ can conduct electricity.
4. The metal _____ is used in thermometer.
5. Galena is an ore of the metal _____
6. Pure Gold is _____ carat.
7. The most malleable metal is _____
8. The metal_____is stored under kerosene.
9. During electrolytic refining of zinc, the metal is deposited on _____electrode.
10. _____is the lustrous non-metal.

C. Among the following rewrite the false statements correctly.

1. Calcium is the most abundant metal on earth's crust.

Ans :

2. Negatively charged ions are called cations.

Ans :

3. Electronic configuration of sodium ion and Neon atom is same

Ans :

4. Chlorine atom gains one electron to form a cation.

Ans :

5. Haematite is an ore of copper.

Ans :

6. Calcination is done in presence of air.

Ans :

7. Only Zinc Suplphide is roasted.

Ans :

8. All the minerals are ores but all the ores are not minerals.

Ans :

9. The process in which iron articles are coated with Zinc is called Galvanisation.

Ans :

10. The ore bauxite is concentrated by Leaching.

Ans :

D. Questions based on Assertion and Reason : 1 Mark

Direction : In these questions (From Q1 to Q10) statement and its reason is given. Choose the correct option by following the direction given below.

a. Both the statement and reason is correct, also reason is the correct explanation of the statement.

b. Both the statement and reason is correct, but the reason is not the correct explanation for the statement.

c. The statement is correct, but not the reason.

d. The statement is wrong but the reason is correct.

1. Statement : Metals are good conductors of electricity.
   Reason : Metals have free electrons.

Ans :

2. Statement : Iron Pyritis is the Ore of Iron.
   Reason : Iron Pyritis is a mineral of Iron.

Ans :

3. Statement : Aqueous solution of Sodium Chloride is conductor of electricity
   Reason : Sodium Chloride produces ions in aqueous solution.

Ans :

4. Statement : Zinc Oxide is an amphoteric Oxide.
   Reason : Zinc Oxide reacts with base to produce salt and water but do not react with acid.

Ans :

5. Statement : Silver reacts with dil H_2SO_4 to produce hydrogen gas.
   Reason : Silver is placed below Hydrogen in the electrochemical series.

Ans :

6. Statement : Sodium is placed above Potassium in the reactivity series of metals.
   Reason : Sodium gets oxidised more easily than Potassium by losing one electron.

Ans :

7. Statement : Magnesium produces nitride along with its oxide, when burnt in air.
   Reason : Magnesium has strong affinity for Nigrogen.

Ans :

8. Statement : Tin (Sn) is a metal.
   Reason : Tin (Sn) has four valence electrons.

Ans :

9. Statement : Nitrogen is a non-metal.
   Reason : Nitrogen has five valence electrons.

Ans :

10. Statement : The blue colour of copper Sulphate solution fades away when an Iron plate is dipped in it.
    Reason : Iron is placed above copper in the electrochemical series.

Ans :

E. Answer in one word : 1 Mark

1. Name a coinage metal.

Ans :

2. Name a liquid non-metal.

Ans :

3. Name a metal which do not react with either cold water or hot water.

Ans :

4. An element X reacts with oxygen to form an acidic oxide X_2O_7. Is X a metal or a non-metal?

Ans :

5. Mention whether the reaction of metals with dilute acids is endothernic or exothermic?

Ans :

6. Which metal is a component of both the alloys brass and bronze?

Ans :

7. For which property metals can produce sound?

Ans :

8. The wires used in domestic electric circuits are covered with insulators. Name any of the problable insulators.

Ans :

9. Which property of non-metals causes their brittleness?

Ans :

10. What is the electro valency of Magnesium?

Ans :

F. Very short answer questions: 1 Mark

1. What happens when calamine is heated strongly in absence of air?
2. Name the compound produced when calcium reacts with water?
3. Which compound is produced by Chlor - alkali process?
4. Does solid sodium chloide conduct electricity ?
5. How do the diamond & graphite related?
6. A non-metal is main component of our food, which produce two oxides - one is poisonous, another is responsible for global warming. Name the non-metal.
7. Is Leaching a physical or chemical process? Give reason in support of your answer.
8. Nitric acid can be stored in aluminium container - Why?
9. Which type of ores are concentrated by magnetic separation?
10. A compound X is used with aluminium to join railway tracks. What is X?

G. Answer in short : 2 marks

1. What is smelting?
2. What is electrovalency?
3. Why are the electrical wires covered with PVC?
4. Why is Froth floatation process applied for sulphide ores?
5. Why are the metals Platinum, Gold, Silver used to make jewellery?
6. In metallurgy why do the carbonate & sulphide ores are transformed into oxides?
7. Mention two processes to prevent rusting.
8. What is flux?
9. Why do electrovalent compounds have high melting points?
10. What is the basic difference between an alloy & amalgam?

H. Long answer type question : 3 Marks

1. In electrolytic refining of a metal what would you take as the cathode, the anode & the electrolyte?
2. You are given a hammer, a battery, a bulb, wires and a switch. How would you use them to distinguish between samples of metals and non-metals?
3. a) Differenciate between alloys & amalgam.
   b) Name two metals which do not corrode.
4. All the ores are minerals, but all the minerals are not ores - Explain with example.

5. Write the electron dot structure of the following compounds. MgO, N_2, Na_2O.

6. a) Name the metal with lowest melting point.

   b) Name a metal which can displace hydrogen gas from nitric acid.

   c) How could you classify an inert gas as a metal or a non-metal?

7. a) Which of the following oxides are acidic, basic or amphoteric?

   CaO, P_2O_5, N_2O, SO_3, K_2O, H_2O

   b) Find the amphoteric oxides from the following - Al_2O_3, NO_2, PbO, P_2O_3, BaO

8. a) Name the comound produced when SO_3 is added to water.

   b) State whether the above reaction is exothermic or endothermic?

9. a) Name the compound produced when Na_2O is added to water.

   b) What would be the nature of its aqueous solution?

   c) How could the aqueous solution change the colour of litmus solution?

10 a) Iron gets corroded more than Aluminium when exposed to air ___ why?

   b) What would be the change in colour of the solution if Ag metal is dipped in $FeSO_4$ solution?

11. Name a metal with low melting point and a non-metal with high melting point. Name a metalloid.

12. What is thermite mixture? Write its application.

13. Why is Al used as wrapper of medicines? Why is copper used in making cooking utencils?

14. What is the difference between roasting and calcination?

15. Zinc can displace hydrogen from dilute hydrochloric acid but copper can not. Why?

16. Why sulphide ore is converted to metallic oxide before extraction of the metal?

17. Carbon reduction process is not suitable for extracting magnesium metal from its oxide. Explain why?

18. What are the compounds produced when magnesium metal is burnt in air?

19 Why do the metals gold and platinum disssolve in aqua-regia?

20. Why is it necessary to galvanise iron sheets?

I. Comprehension Type Question. 3 Marks

1. Metals are found in nature both as their compounds, as well as free metals. Less reactive metals are found in free state. Most of the metals exist in nature as, minerals. The minerals from which metals can be extracted commercially are called ores. Some minerals of iron are Iron pyritis (FeS_2), Siderite ($FeCO_3$) Haematite (Fe_2O_3), Magnetite (Fe_3O_4) etc. Among these Fe_2O_3 and Fe_3O_4 are iron ores.

(i) Which metal among the following exist in free state? a) Na, (b) Ca (c) Mn (d) Au

(ii) Which of the following is halide ore? (a) Cimabar (b) Galena (c) Calamine (d) Horn Silver

(iii) Electrolytic reduction is applied for the compound

a) Al_2O_3 (b) PbS (c) $ZnCO_3$ (d) ZnS

2. In reactivity series metals are arranged according to their reactivity in a vertical column. Moving downwards from the top the metalic reactivity decreases. Hydrogen, though a non-metal, is included in the series. It helps to study the comparative reactivity. Also hydrogen loses one electron to form a cation.

$H = H^+ + e$

(i) Which of these elements can displace Iron from Ferrous Sulphate solution.

a) Pb (b) Cu (c) Sn (d) Zn

(ii) Which of these elements do not react with dil sulphuric acid, but reacts with concentrated $H_2SO_{4?}$

a) Au

b) Cu

c) Z

d) Pb

(iii) which of these metals are active metals?

a) K

b) Sn

c) Ca

d) Au.

Chapter-4

Carbon and its Compounds

Chapter at a glance :

1. Carbon is present 0.02% on the earth crust as minerals and 0.036% as carbon dioxide in the atmosphere. Although it is present in small quantities in nature, its importance is immense.
2. Organic compounds are covalent compounds consisting of carbon. Besides carbon the elements like hydrogen, oxygen, nitrogen, sulphur, halogens etc. are also present in organic Compounds.
3. Carbon atom has four electrons in its valence shell. As a result, the valency of carbon atom is four. The valence electrons of carbon atom by sharing form four covalent bond.
4. The Covalent bonds are strong enough. But the melting point and boiling point of covalent compounds are low as the intermolecular forces are very weak. Organic compounds are non-conductors of electricity.
5. Carbon is one of the Polymorphic elements. Crystalline allotropes of carbon are diamond, graphite and Fullerence. Diamond is hard and non-conductor of electricity, but graphite is soft, slippery and good conductor of electricity.
6. The main reason for the versatility of carbon is the catenation property of carbon and its tetravalency. catenation is the unique property of carbon atom to combine with other carbon atoms through covalent bonding to form numerous organic compounds.
7. Due to this catenation property carbon atoms are linked with each other by means of single covalent bond, double covalent bond or triple covalent bond to form long chain, branched chain or cyclic chain of carbon.
8. Organic compounds composed of carbon and hydrogen are called hydrocarbons. Hydrocarbons in which carbon atoms are linked with each other by means of single bonds are called saturated Hydrocarbon or alkane.

   Hydrocarbons in which carbon atoms are linked with each other by means of double bond or triple bond are called unsturated hydrocarbons. Hydrocarbons formed by carbon-carbon double bond are called alkenes and hydrocarbons formed by carbon-carbon triple bond are called alkynes.

9. The general formula of alkane, alkene and alkyne are C_nH_{2n+2}, C_nH_{2n}, C_nH_{2n-2} respectively.

10. Alkyl groups are formed when a hydrogen atom is removed from an alkane.
Example : $-CH_3$, $-C_2H_5$, $-C_3H_7$
The group that determine the characteristic chemical properties of organic compounds are called functional groups.
Example : –CHO, –COOH, –OH

11. A series of organic compounds with the same general formula, the same functional group, the same chemical properties, prepared in the same general method but any two successive members differ by CH_2 group in their molecular formula is called homologous series and the members are called homologue to each other.
For example : the homologues of alkane series are - CH_4, C_2H_6, C_3H_8, C_4H_{10} , ...

12. Despite the common method of nomenclature, organic compounds are named by IUPAC method by changing the carbon chain by prefix or suffix according to the nature of the functional group present in the compound.

Example : $\rightarrow$	CH_3OH	CH_3COOH	CH_3CHO
IUPAC Name :	Methanol	Ethanoic acid	Ethanal
Common Name :	Methyl Alcohol	Acetic Acid	Acetaldehyde

13. On combustion in excess air carbon compounds or organic compounds produce CO_2 and water vapour. At the same time heat and light energy is generated.

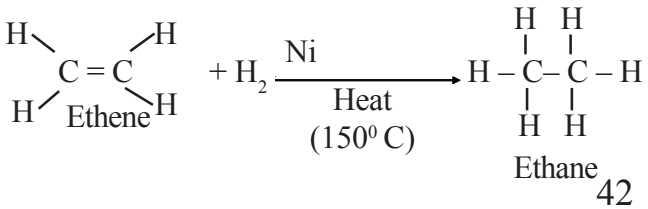
$C + O_2 \rightarrow CO_2 +$ heat + light

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O +$ heat + light

14. In oxidation reactions, some special oxidising reagents like alkaline $KMnO_4$ or acidic $K_2Cr_2O_7$ can be used to oxidize one organic compound to another. .....

$$\underset{\text{Ethanol}}{CH_3{-}CH_2{-}OH} \xrightarrow[\text{or Acidic } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} \underset{\text{Ethanoic acid}}{CH_3COOH}$$

15. Un saturated organic compounds participate in addition reactions. In the presence of Nickel catalyst, ethene is converted to ethane by the addition reaction with hydrogen at high temperature.



16. Saturated organic compounds participate in substitution reaction under suitable conditions. In this reaction, one atom or group of atoms are substituted by another atom or group of atoms.

For example :

$$CH_4 + Cl_2 \xrightarrow{\text{Sunlight}} CH_3Cl + HCl$$

17. Ethanol is a colourless, transparent liquid with specific smell. It is used as an organic solvent. It is water soluble. It is used in the preparation of intoxicants. An aqueous solution of 95.6% ethyl alcohol is called rectified spirit. A mixture of 95% Ethyl alcohol and 5% Methyl alcohol is called methylated spirit. It is toxic, beside that it is used as a fuel in the form of power alcohol mixed with petrol. Ethanol undergoes the following reactions :

$$2Na + 2C_2H_5OH \rightarrow 2C_2H_5ONa + H_2 \uparrow$$

$$CH_3CH_2OH \xrightarrow[\text{Concentrated } H_2SO_4]{\text{Hot and}} CH_2 = CH_2 + H_2O$$
$$(165 - 170)^0C$$

18. IUPAC name of acetic acid is ethanoic acid. It is a colourless, transparent liquid with specific smell, which is soluble in water. An aqueous solution of 5-8% ethanoic is called vinegar, which is used as a preservative in the pickle industry. The melting point of acetic acid is 290K, so it freezes in winter and hardens like ice. It is also called glacial acetic acid.

Ethanoic acid undergoes the following reactions, out of which Esterification reaction is noteworthy.

$$CH_3COOH + CH_3 - CH_2OH \xrightarrow[H_2SO_4]{\text{concentrated}} CH_3COOC_2H_5 + H_2O$$

$$CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$$
$$CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + CO_2 + H_2O$$
$$2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + CO_2 + H_2O$$

19. Both soap and detergent act as cleansing agents. Soaps are sodium or potassium salts of long chain carboxylic acids with high molecular masses and detergents are sodium or potassium salts sulphonic acids (or sodium/ammonium salt of a long chain alkyl hydrogen sulphate).

Soap acts only in soft water and is biodegradable, but detergent acts with both soft water and hard water. Detergent is non-biodegradable. Soap dissolves in water easily and when dirty clothes are soaked in soapy water, the soap molecules arrange themselves into tiny clusters called **micelles**.

A. Choose / select correct answer for each of the following question. (MCQs) : 1 Mark

1. The percentage of carbon on the earth's crust in the form of minerals is ___

a) 0.03 b) 0.02 c) 0.04 d) 0.01

Ans :

2. The type of bond present in organic compounds is ___

a) covalent bond. b) Electrovalent bond c) Metallic bond d) Coordinate bond.

Ans :

3. Valency of carbon is

a) 4 b) 3 c)2 d)1

Ans :

4. The crystalline allotrope of carbon is ___

a) Graphite b) Diamond c) Fullerene d) All of these.

Ans :

5. The maximum number of carbon atoms bonded to a carbon atom in diamond is ___

a) 3 b) 4 c) 2 d) 5.

Ans :

6. The allotrope of carbon which is conductor of electricity ___

a) Diamond b) Graphite c) Coke d) Lampblack

Ans :

7. The property of carbon due to which a large number of organic compounds are formed is ___

a) Catenation b) Isomerism c) Formation of homologous series d) All of these.,

Ans :

8. General formula of alkane is ___

(a) C_nH_{2n}

(b) C_nH_{2n+1}

(c) C_nH_{2n+2}

(d) C_nH_{2n-2}

Ans :

9. The first organic compound prepared in the Laboratory is ___

a) Ammonium cyanate b) Urea c) Acetic acid d) Ethanol

Ans :

10. Which of these is a member of alkyne series?

a) C_2H_6

b) C_3H_4

c) C_4H_{10}

d) C_5H_6

Ans :

11. The molecular formula of a member of a homologous series is C_4H_9OH. The formula of its previous member is ___

a) C_2H_5OH

b) C_3H_7COOH

c) C_3H_7OH

d) C_4H_7OH

Ans :

12. The functional group of ethanoic acid is ___

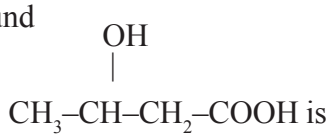
a) – OH

b) – COOH

c) – CHO

d) $-CH_2O$

13. The IUPAC name of the compound



$CH_3–CH–CH_2–COOH$ is

a) 2– Hydroxy propanoic acid

b) 2 – Hydroxy proponoic acid

c) Carboxy – 2 – propanol

d) 3 – Hydroxy butanoic acid

Ans :

14. The product obtained by the incomplete combustion of methane is ___

a) CO_2

b) CO

c) H_2CO_3

d) C_2H_6

Ans :

15) The product obtained by oxidation of ethanol is ___

a) Acetic acid b) Ethane c) Ethene d) Methane

Ans :

16. The product obtained when methane reacts with chlorine in presence of sunlight is ___

a) Methyl Chloride b) CFC c) Ethyl Chloride d) Methyl alcohol

Ans :

17. The catalyst used in the preparation of ethane from ehtene is ___

a) Na

b) Fe

c) V_2O_5

d) Ni

Ans :

18. The compound present in power alcohol is ___

a) Methanol b) Ethanol c) Propanol d) Butanol.

Ans :

19. The percentage of acetic acid in vinegar ___

a) 10-20% b) 20-25% c) 5-8% d) 50-60%

Ans :

20. Which of the following reacts with sodium bi carbonate to produce carbon di oxide ___

a) Ehtanoic acid b) Ethanol c) Ethane d) Ethene

Ans :

21. The chemical Formula of soap is ___

a) $C_{17}H_{35}CHO$

b) $C_{17}H_{35}COOH$

c) $C_{17}H_{35}COONa$

d) $C_{17}H_{35}CH_2ONa$

Ans :

22. The biodegradable substance in between soap and detergent is ___

a) Soap b) Detergent c) Both of these d) None of these.

Ans :

B. Fill in the blanks : 1 Mark

1. The percentage of CO_2 in atmosphere is ___

2. Covalency of carbon in methane is ___

3. Diamond is ___ of electricity.

4. ___ is the first scientist who synthesized organic compound in the laboratory.

5. The functional group of aldehyde compounds is ___

6. The hydrocarbons containing carbon-carbon double bond and triple bond are known as ___

7. At high temperature, ethene reacts with hydrogen in presence of nickel to produce ___

8. ___ alcohol is used to prepare narcotics.

9. Alcohol and carboxylic acid reacts in the presence of conc. H_2SO_4 to produce ___

10. ___ gas is known as marsh gas.

11. Soap combines with oily dirty particles to form.

C. Correct the following sentences which are wrong. 1 Mark

1. Six covalent bonds are present in the compound having molecular formula C_2H_6.

Ans :

2. If the lower part of the vessel becomes black during cooking, it means that it is wet.

Ans :

3. Graphite have high melting point and boiling point.

Ans :

4. Double bonded hydrocarbons are known as alkynes.

Ans :

5. IUPAC name of isobutane is methyl propane.

Ans :

6. The molecular formula of successive homologue differ by a - CH_2 group.

Ans :

7. Only heat is produced in combustion reaction.

Ans :

8. Saturated hydrocarbons produce yellow flame with large amount of smoke.

Ans :

9. Vanaspati oils are unsaturated.

Ans :

10. Impure acetic acid is known as glacial acetic acid.

Ans :

11. Soap forms micelle in aqueous solution.

D. Answer the following assertion and reason type questions : 1 Mark

Direction : In these questions (to 8) statement and its reason is given. Choose the correct option by following the direction given below :

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

b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

c) Assertion (A) is true but reason (R) is false.

d) Assertion (A) is false but reason (R) is true.

1. Assertion (A) : covalency of carbon is four.

Reason (R) : Carbon has four unpaired electrons in its valence shell.

Ans :

2. Assertion (A) : Graphite is slippery.

Reason (R) : Carbon-carbon covalent bonds are present in grphite.

Ans :

3. Assertion (A) : Methane participates in the hydrogenation reaction.

Reason (R) : Unsaturacted organic compounds give addition reactions.

Ans :

4. Assertion (A) : Benzene is an unsaturated hydrocarbon.

Reason (R) : Benzene has three double bonds.

Ans :

5. Assertion (A) : The Chemical properties of methanol and ethonol are almost same.

Reason (R) : Methanol and ethanol are prepared by the same method.

Ans :

6. Assertion (A) : Soap does not form foam in hard water.
Reason (R) : Soap is sodium salt of organic acid of high molecular mass.
Ans :
7. Assertion (A) : Methane is generally inert in nature.
Reason (R) : Methane is a saturated hydrocarbon
Ans :
8. Assertion (A) : Methanol is added to preserve Ethanol.
Reason (R) : Methanol is toxic in nature.
Ans :

E. Answer the following questions in one word : 1 Mark

1. What type of hydrocarbon is methane?
Ans :
2. Which gas is produced by burning organic compounds in sufficient amount of air?
Ans :
3. Which scientist proved that the vital force theory is wrong?
Ans :
4. Give an example of aromatic compound?
Ans :
5. Write the general formula of alkyne compound.
Ans :
6. What is the melting point of pure Ethanoic acid?
Ans :
7. Write the name of the dehydrating agent used in the preparation of ethene from ethanol.
Ans :
8. Write the chemical formula of soap.
Ans :
9. What percentage of ethanol is present in absolute alcohol?
Ans :
10. By which process ethanol is made from molasses?
Ans :
11. Write the name of the reagent used in the preparation of acetic acid from ethanol.
Ans :

F. Answer the following questions in one sentence : 1 Mark

1. What is catenation?

Ans :

2. What is fullerene?

Ans :

3. What is rectified spirit?

Ans :

4. What is vital force theory?

Ans :

5. What is the main reason for the versatile character of carbon?

Ans :

6. Write the structural formula of 2-Chlorobutane.

Ans :

7. What type of compound is detergent?

Ans :

8. Which compound can be used to mark on diamonds?

Ans :

9. What is glacial acetic acid?

Ans :

10. Give an example of substitution reaction.

Ans :

11. What is methylated spirit?

Ans :

12. Write the structural formula of cyclohexane.

Ans :

13. Why is acetylene called unsaturated hydrocarbon?

Ans :

G. Answer the following questions briefly : 2 Marks

1. Valency of carbon is four – explain.
2. What are the main reasons for versatile character of carbon?
3. What is homologous series and what are Homologue?
4. Explain why diamond is non-conductor but graphite is conductor of electricity.
5. Explain why diamond is hard but graphite is soft.
6. What are saturated and unsaturated organic compounds? Give example of each type.

7. What is functional group? Write the formula of functional groups of aldehyde, ketone and alcohol.
8. Write two characteristics of homologous series.
9. Write with an equation – what happens when methane is burnt in sufficient air.
10. What is addition reaction? Give one example
11. Write short note : Substitution reaction.
12. What is esterification reaction? Give example.
13. What is marsh gas?
14. Write two differences between soap and detergent.
15. Write two differences between ethanol and ethanoic acid on the basis of physical properties.

H. Long answer type question : 3 Marks

1. Write the electron dot structure of the following compounds ___

a) Ethanol b) Propanone c) Methane

2. Write the name of the following compounds by IUPAC method ___

a) $CH_3 - CH = CH - CH_3$

b) $CH_3 - \underset{\underset{OH}{|}}{CH} - CH_3$

b) $CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_2 - COOH$

3. Write the structural formula of the following compounds ___

a) 2- Hydroxy propanoic acid b) 2- Bromo - 2- Chlorobutane c) 2- Methyl pent - 2-ene

4. What happens and write the equation ___

a) Ethanol is burnt in the presence of air

b) Ethene is reacted with hydrogen in the presence of nickel catalyst.

c) Methane is reacted with chlorine in the presence of sunlight.

5. Describe the cleansing action of soap.

6. What is hydrogenation reaction? What are its applications in the industry?

7. Complete the following reactions ___

a) $C_2H_5OH + Na \rightarrow$

b) $CH_3COOH + Na_2CO_3 \rightarrow$

c) $CH_3CH_2OH \xrightarrow[\text{Alkaline } KMnO_4]{\text{Heat}}$

8. Why do substances burn with or without flame?

9. Write some uses of ethanol and ethanoic acid in industry.

10. The molecular mass of an organic compound hydrocarbon A is 28. The compound responds to addition reaction with hydrogen and produces another compound. B. Compound B is a saturated organic compound. Combustion of B produces a colourless odourless gas which turn lime water milky.

a) What is the molecular formula and name of the compound A.

b) Write the structural formula of the compound B.

c) What is the name of the colourless, odourless gas produced?

11. A colourless transparent liquid A is used to make sura (wine). When A is heated with acidified $K_2Cr_2O_7$, another compound B is produced. Compound B reacts with $NaHCO_3$ to produce CO_2 and changes blue litmus into red. Compound B responds to neutralisation reaction with NaOH.

a) Write the molecular formula and IUPAC name of the compound A.

b) Write the reaction of $NaHCO_3$ with compound B.

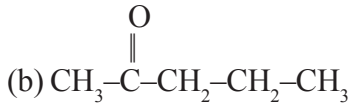
c) Write the compound B as acidic or alkaline.

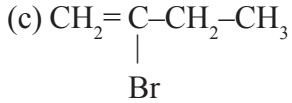
I. Answer the following questions : (Very long answer type) 5 Marks

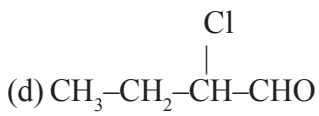
1. Write five differences between organic and inorganic compounds

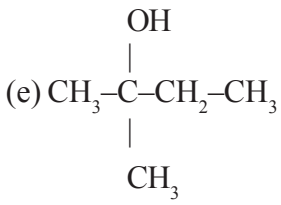
2. Name the following compounds by IUPAC method

(a) $CH_3–C \equiv C–CH_2–CH_3$

(b)


(c)


(d)


(e) 

3. Write the structural formula of the following compounds.

a) 2, 3- Dibromo - 2,3 - dichloro butane.

b) 2-Bromo-3-methyl pentane.

c) Propanone

d) 2-Hydroxy-3-butanone.

e) 2,3 - Dimethyl butane.

4 a) Distinguish between ethane and ethene by using a chemical test.

b) How to convert ethanol to ethanoic acid.

c) Write the name and structural formula of a cyclic hydrocarbon.

5. Show the different allotropes of carbon with the help of a chart and write the usage of each one.

Chapter-5

Periodic Classification of Elements

Chapter at a glance :

1. The process of classifying elements in a regular order on the basis of their property is known as periodic classification. To develop this tabular arrangement of elements Doberiner triads, Newland's Law of octaves, Mendeleev's periodic Law and Modern periodic laws played important roles.

2. According to Dobereiner's Triads, the Atomic weight of the middle element of a triad is the arithmetic mean of the other two elements. For example: - Li (6.9), Na (23) ; K (39) is a triad and average atomic mass of Li and K is very similar to that of Na (23)

3. Newland's law octaves of says the property, of next eighth element from any element shows repetition, like eighth note of an octave of music.

4. Mendeleev's Periodic law states - the physical and chemical properties of the elements are the periodic functions of their atomic weights.

5. The tabular arrangement of elements in rows and columns with 63 elements - is known as Mendeleev's periodic Table. In Mendeleev's periodic Table modified there were eight groups and seven periods.

6. Some limitations of Mendeleev's periodic Table are –

(a) Position of Isotopes.

(b) Position of Hydrogen.

(c) Position of rare earth elements.

7. To overcome the shortcomings of Mendeleev's periodic table Henry Moseley put forward the Modern Periodic Table in which elements are arranged in the order of increasing atomic number's.

Moseley established that the properties of elements depend on the arrangement of electrons in different shells not on the atomic weights.

8. Modern periodic Law states that - the physical and chemical properties of the elements are the periodic functions of their atomic numbers

9. In modern periodic table there are 18 groups and 7 periods. The elements of each group have same outer electronic configuration; hence having similar properties. Each period begins with an element having one electron in outermost shell and ends with an element having completely filled outer shell (zero group elements)

Following are the some groups which has been given special name -

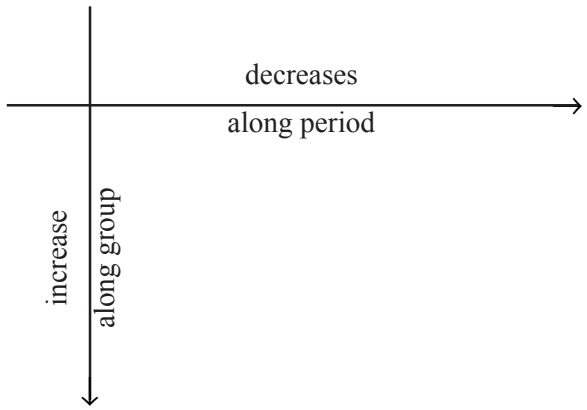
Groups	Name	Element
Group- 1	Alkali metal	Li, Na, k, Rb, Cs, Fr
Group- 2	Alkaline Earth Metal	Be, Mg, Ca, Sr, Ba, Ra
Group- 16	Chalcogen	O, S, Se, Te, Po
Group - 17	Halogen.	F, Cl, Br, I
Group -18	inert/noble/ rare gases ,	He, Ne, Ar, Kr, Xe, Rn

The periods have different names depending on the number of element present in each.

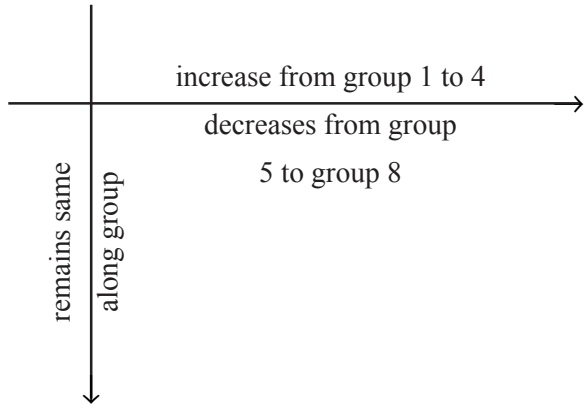
period	Mame	No of Elements
First	very short period	2
2nd	Short period.	8
3 rd.	short period	8
Fourth	Long period	18
Fifth	Long period	18
Sixth	very long period	32
Seventh	Incomplete period	-

10. In the elements are arranged in increasing atomic number, some properties reapper at some regular interval. Properties of elements that reappear at regular intervals are called periodic properties. Atomic radius, valency, metallic character, non metalise character are some periodic properties.
11. The charts below show how do the periodic properties of elements change on moving towards the right from the left across a period of on moving downwards from the top along a group.

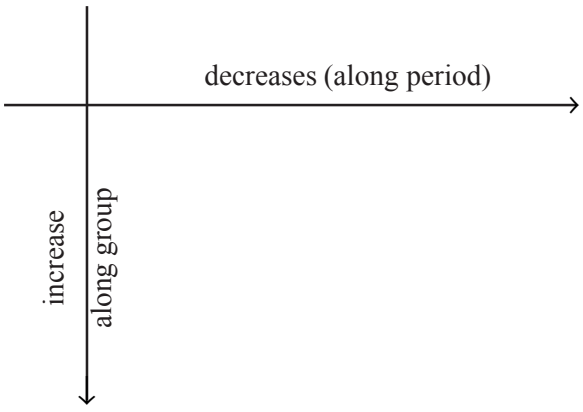
* Atomic radius



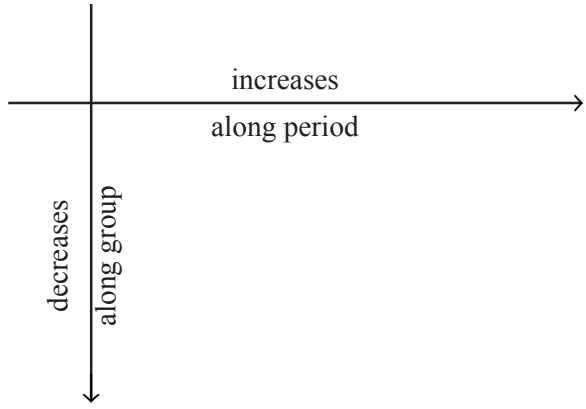
* Valency



* Metallic properties



* Non metallic properties

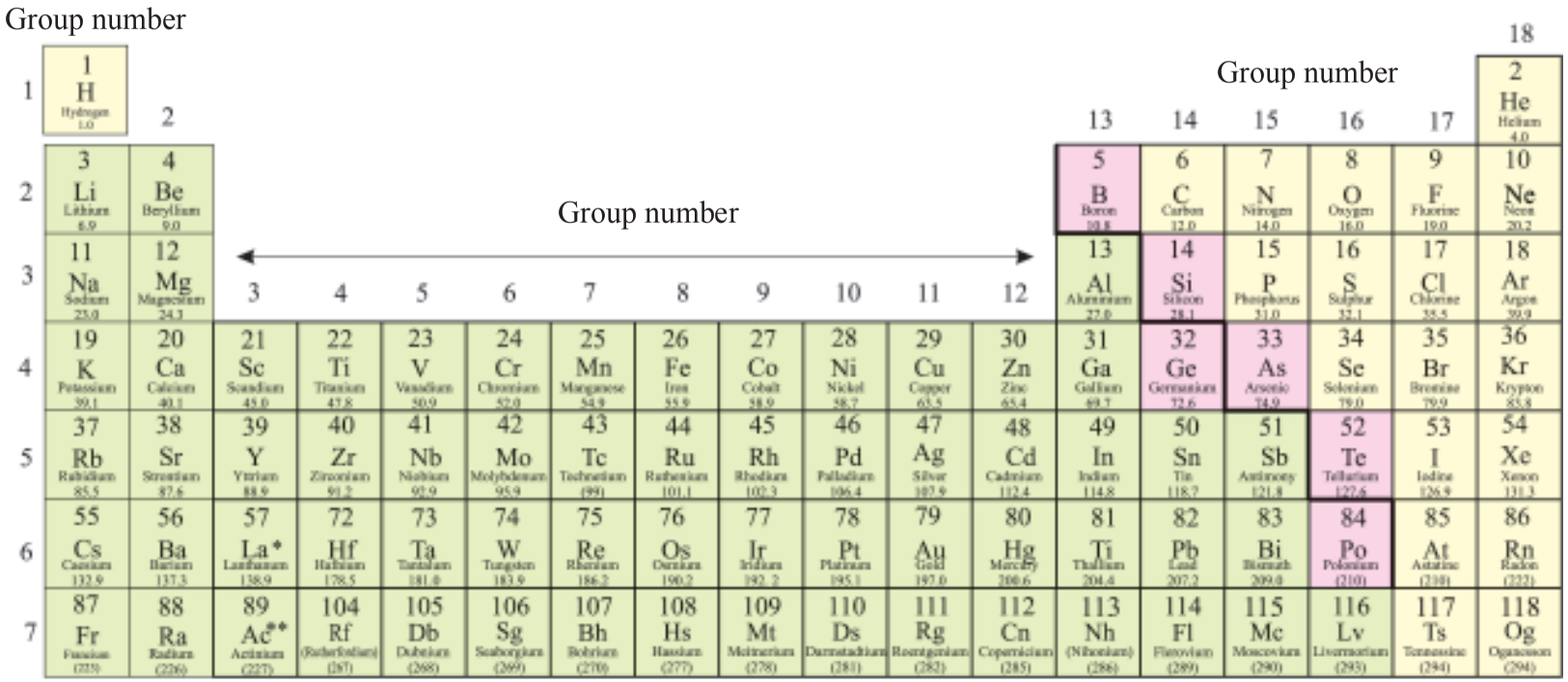


12. If metallic character of elements increase, then basicity of their oxides also increase. If nonmetallic character of elements increase, then acidity of their oxides also increase.
13. Generally metals are electropositive and nonmetals are eletronegative.

5.6 Modern Periodic Table

Metals | Metalloids | Non-metals

Metals and Non-metals are separated by curved lines



* Lanthanoid	58 Ce Cerium 140.1	59 Pr Praseodymium 140.9	60 Nd Neodymium 144.2	61 Pm Promethium (145)	62 Sm Samarium 150.4	63 Eu Europium 152.0	64 Gd Gadolinium 157.3	65 Tb Terbium 158.9	66 Dy Dysprosium 162.5	67 Ho Holmium 164.9	68 Er Erbium 167.3	69 Tm Thulium 168.9	70 Yb Ytterbium 173.0	71 Lu Lutetium 175.0
** Actinoid	90 Th Thorium 232.0	91 Pa Protactinium (231)	92 U Uranium 238.1	93 Np Neptunium (237)	94 Pu Plutonium (242)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (245)	98 Cf Californium (251)	99 Es Einsteinium (254)	100 Fm Fermium (253)	101 Md Mendelevium (256)	102 No Nobelium (254)	103 Lr Lawrencium (257)

Identify the correct answer for the following questions- (MCQs) 1 Mark

1. The number of natural elements are
   a) 94, b) 90 c)100 d) 92
2. Who discovered triads rule (Law) -
   (a) Newland (b) Mandeleev (c) Moseley (d) Dobereiner
3. Who was the founder of octet rule -
   (a) Mendeleev' (b) Moseley (c) Newland (d) Dobereiner
4. The number of elements in third period is -
   (a) 8 (b) 18 (c) 12 (d) 6
5. Among the following which one is inert element ?
   (a) Nitrogen (b) Helium (c) Carbon (d) Chlorine.
6. Eka boron element is -
   (a) Gallium (b) Silicon (c) Germenium (d) Scandium
7. The total number of period in Mendeleev's periodic table is -
   (a) 8 (b) 7 (c) 6 (d) 9
8. Total number of Groups in Modern Periodic table is
   (a) 8 (b) 14 (c) 18 (d) 16
9. The atomic mass of which of the follwing element has been corrected by Mendeleev's discovery of the periodic table -
   (a) Boron (c) Berilium (d) Carbon (d) Nitrogen.
10. Among the following element which one have three valence shell electrons?
    (a) Al (b) Be (c) O (d) F
11. The number of electrons in the valence sheell of the Second group of elements are -
    (a) 3 (b) 2 (c) 1 (d) 4
12. An element A has atomic number 15, to which group element "A belongs?
    (a) Third group
    (b) second group
    (c) fifth Group.
    (d) First Group.
13. Which of the following is the correct order of Metallic properties - .
    (a) Li < Na<K (b) K < Na < li
    (c) Na < Li < K . (d) Na < K < Li
14. The atomic size of which element of the following is maximum –
    (a) Nitrogen (b) Carbon, (c) Boron, (d) oxygen
15. An element M. has electronic configuration 2,8,1, formula of its oxide is -
    (a) MO (6) MO_2 (C) M_2O (d) M_2O_3

16. Among the following which one is metalloid -

(a) Na (b) Si (c) C (d) F

17. Which of the following is the correct order of non-metalic Character

(a) C < N < O < F (b) F < N < O < C (c) N < O < F < C (c) O < N < C < F

18. Valency of an element A with atomic number 9 is -

(a) 7 (b) 9 (c) 0 (d) 1

19. Which one is not a periodic property ?

(a) Metallic Property

(b) Atomic Size

(c) Colour

(d) Non Metallic property.

20. Halogen elements are located in which group in the periodic table -

(a) I-A (b) VII - A (c) VI -A (d) IV-A

B. Fill in the Blanks - 1 Mark

1. There are _____ periods and _____ groups in modern periodic table.
2. Eka aluminium element is _____
3. The third period of the periodic table is called _____ Period.
4. The alkali metals in periodic table are located in _____ group.
5. Elements A, B and C form Dobereiner's triads, atomic mass of element A and B are 10 and 20 respectively, then the atomic mass of C is _____.
6. Sixth group elements are known as _____ .
7. The smallest halogen element is _____.
8. Newlands's octave rules are applicable up to _____.
9. Formula of oxide of magnesium element is _____.
10. Arsenic element is a _____.

C. Correct the sentences below that are incorrect: 1 Mark

1. Li, Na and Ca are known as Dobereiner's triad group.
2. The first group elements in the periodic table is called . alkali metal
3. Colour of element is a periodic property.
4. According to Mendeleev's periodic Law, the physical and Chemical properties of the element are repeated periodically according to the increasing value of the atomic number

5. The alkaline (basic) properties of the oxides of an element. gradually increases as they move from top to bottom in a group

6. Group-15 elements in the periodic table are called Chalcogen.

7. The two isotopes of chlorine are located in the same - place in periodic table.

8. Total number of elements in third period are 18.

9. Valence shell electrons of oxygen & Sulphur are same.

10. Metals are generally electro positive.

11. Non-metallic oxides are alkaline in nature. (basic)

D. Answer the following Assertion & Reason type questions - 1 Mark

Direction: In these questions (From Q 1 to Q 9) statement and its reason is given. Choose the correct option by following the direction given below.

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

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

(c) Assertion is true but Reason is false.

(d) Assertion is false but Reason is true.

1. Assertion: Valency of Aluminium is 3

Reason: valence shell of aluminum contain 3 electrons

2. Assertion: Atomic radius generally decreases if we go top to bottom in a group.

Reason : The effective nuclear charge decreases along

the group.

3. Assertion : Noble gasses are ranked in 18^{th} group.

Reason : Noble gasses are chemically inactive. (or inert)

4. Assertion : Cobalt has been given a place before nickel in the periodic Table.

Reason : Atomic number of nickel is more than that of cobalt.

5. Assertion : Hydrogen is an alkali metal.

Reason : The Electronic configuration of hydrogen is similar to that of alkali metals.

6. Assertion : Fluorine and chlorine elements are present in same group.

Reason : Fluorine & chlorine both are halogen.

7. Assertion : Antimony (Sb) is a metalloid.

Reason : Antimony contains both metallic and non metallic property.

8. Assertion : Metals are generally electropositive.

Reason : Metals easily eliminate electron.

9. Assertion : In the second period, the size of sodium element is the largest.

Reason : Atomic number of sodium atom is the lowest in the second period.

E. Answer the following in one words. 1 Mark

1. What is the total number of elements in the periodic table so far?
2. The property of every eighth element is similar to the first element – Who says this Statement?
3. The element eka silicon was actually called which element ?
4. Who made the statement. 'The properties of the elements are periodic functions of their atomic masses"?
5. Which periodic function of the element determines the properties of element in the Modern periodic law?
6. What is the number of electons in the valence shell of Noble gases?
7. Which elements show the properties of both metals and non-metals ?
8. How many elements are present in fourth period?
9. Na, K, Rb what are these elements called?
10. Give one example of an element whose number of electrons in the second shell is twice the number of electrons in the first shell.
11. Give one example of electropositive element.
12. What are the maximum number of electrons present in fourth shell?

F. Answer the follwing questions in one sentence: 1 Mark

1. Write one limitation of Dobereiners triad Law.
2. What is Newland's octave rule ?
3. Write one similarity between Hydrogen and alkali metals.
4. What are isotopes?
5. Where are the lanthanoids located in the periodic table?
6. Where are metals and where are the non-metals found in periodic table?
7. What is the atomic radius?
8. What do the metals do during bond formation?
9. Is there any similarity between two elements potassium & sodium?
10. Why is helium called an inert element?
11. Mention a property of boron that is found in other elements of that group.
12. What do you mean by valency of an element?

13. Why do the tendency to lose electrons decreases from left to right along the period in the periodic table.

14. Why do Potassium eliminates electron more easily than Sodium?

G. Answer the following questions: 2 Marks

1. Write Dobereiner's triad Law. Give example.

2. Write Newland's Law of octaves. Give example.

3. State Mendeleev's periodic Law .

4. Mention the two limitations of Mendeleev's periodic Law.

5. State modern periodic Law.

6. Mention the limitations of Newland's of Octaves Law.

7. Mention the two limitations of modern periodic Law.

8. Why do atomic size of elements decrease on moving form left to rright along the period?

9. Why were the inert elements placed in separate rows in the periodic table?

10. What is the periodic property of an element ? Give example.

11. What Metalloids? Give examples.

12. The atomic number of an element is 13, find its position (in period & group) in periodic table. write the valency of the element.

H. Answer the following questions: (Long answer type questions) 3 Marks

1. Compare Mendeleev's periodic table with the modern periodic table.

2. How limitations of Mendeleev's periodic table have been corrected with the help of modern periodic law ?

3. What is the change in the following property of the element as it moves from left to right along the period and from top to bottom along the group in periodic table?

a) Atomic Size.

b) Metallic Character

c) Valency.

4. Arrange the following compounds in ascending order of the indicated periodic properties

a) Na, Si, Al, P (Atomic Size)

b) Li, K, Na, Mg (Metallic Property)

c) C, F, N (Non-metallic Property)

5. What is the relationship between the electronic configuration of an atom and the position of the corresponding element in modern periodic table?

6. Two elements A and B forms ionic compound. Atomic number of A and B are 11 and 16 respectively. In this case element A donate electron and element B accepts electron.

a) Write the electronic configuration of A and B.

b) Between this two elements which one is Metal & which one is non-metal?

c) Write the formula of the compound formed by the elements A and B.

7. The position of the three elements A,B and C are shown below in the periodic table -

Group -I	Group -II
	-
-	A
-	-
B	C

a) State whether Element A is metal or Non-metal?

b) Between B and C which one is more reactive?

c) Among A, B and C which one have smallest size.

8. X is an element whose formula of chloride is XCl. XCl is highly Soluble Solid compound with higher Melling point. The element X is first period element and catches fine when it comes in contact with water.

a) What is the name of element X?

b) Compound XCl is ionic or covalent compound ?

c) Element X is metal or non-metal?

9. In which molecule

a) Two orbits are completely filled by electrons?

b) The second shell contains twice electrons compared with first shell.

c) Total three shells contain electrons and valence shell contains 5 electrons?

10. Identify the position of the following elements in periodic table.

a) alkali metal (b) Halogen (c) Noble gas.

Very Long Answer types Questions: 5 Marks

1. The place of hydrogen atom in periodic table is controversial. Explain with your opinion.

2. a) In modern periodic table how it has been possible to determine the position of nickel and cobalt.

b) How the position of isotopes of different elements has been explained in the modern periodic table.

c) In the modern periodic table, Which are the metals among the first ten elements?

3. How and why the following periodic property change on moving from left to right along the period in the periodic table?

a) Atomic size. (b) Non-metallic Property.

4. Explain with reason:

a) Among the elements of the second period, the size of fluorine is least

b) Valency of halogen elements are One.

c) Metallic character of potassium is higher than that of Sodium.

d) Helium is an inert element.

e) Sodium and potassium element is present in same Group.

5.i) Is it possible to have an element with an atomic number of 105 in the space between hydrogen and helium?

ii) Based on what features did Mendeleev's create his periodic table?

iii) Write the electronic Configuration of the element present in third period and the first Group.

6.i) Arrange the following compounds in ascending order based on the indicated periodic properties

a) Li_2O, K_2O, Na_2O (Basic properties)

b) SiO_2, Na_2O, Al_2O_3 (Acidic properties)

ii) Which of the following elements are electropositive and which are electronegative?

iii) What is the atomic radius of hydrogen atom?

Chapter 6

Life Processes

Chapter at a glance :

1) The processes of nutrition, respiration, transport, exertion, etc., are essential for the vitality of the organism.

2) Green plants synthesize high energy rich complex organic matter (sugars) in the presence of sunlight and absorbed inorganic substances from the environment.

3) Different fungi, some green plants and animals cannot synthesize or store all the necessary nutrients within the body. So, heterotrophic mode of nutrittion can be seen in them.

4) There are four types of heterotropic nutrition in the organism-parasitic, symbiotic, insectivorous and saprophytic nutrition.

5) In case of human, consumed food breaks down due to the action of various enzymes in the alimentary canal and becomes absorbable by the small intestine. Carbohydrates are absorbed into the blood stream in the form of monosaccharides, proteins in the from of amino acids and fats in the form of the falty acids and glycerol which are absorbed by the lymph vessels (lactyl) into the blood stream.

6) Respiration is mainly of two types-Aerobic (in presence of free O_2) and Anaerobic (in absence of free O_2). Scientists have also mentioned another type of respiration called fermentation.

7) Food present within the cell is completely oxidized in the process of aerobic respiration and releases CO_2, ethanol or lactic acids and partial amount of energy.

8) RQ (Respiratory Quotient) is the ratio of the concentration of CO_2 exhaled during respiration and concentration of O_2 inhaled during respiration. RQ=1 of carbohydrates, RQ of proteinaceous food is 0.8, RQ of fats = 0.7 and RQ of mixed foods = 0.85.

9) The function of the circulatory system in humans is to transport O_2, CO_2, food and excretory substances.

10) The circulatory system is made up of heart, blood vessels and blood. In the human circulatory system, blood is always circulated through the heart and blood vessels, so closed circulation is commonly seen in vertebrates.

11) The human heart is located in the mediastinum region, diagonally, slightly to the left side between the two lungs.

12) The presence of bicuspid, tripcuspid, pulmonary, aortic and thebesian valves in the heart, makes the blood flow in one way direction.

13) S.A.node in the heart (sino-atrial node), A.V node (atrio-ventricular node) and various special junctional tissues produce the heartbeat.

14) In angiosperms, xylem and phloem tissues are differentiated and form vascular bundles to carry water, mineral salts, food and other transportable objects.

15) The main excretory organ of vertebrates is the kidney. The kidney contains numerous nephrons. Nephrons mainly help in purifying the blood and produce urine.

16) Ammonia produced in the liver by protein metabolism is converted to urea and excreted in the urine. On the other hand, faecal matter is not a metabollic substance, it is a waste product prepared from undigested food substances.

A) Select the correct answer from each of the following questions : Mark-1

1) The gas that is produced during respiration -

a) O_2 b) CO_2 c) SO_2 d) NO_2

2. Which of the following is correct for photoshnthesis ?

a) Both CO_2 & H_2O are oxidized b) Both CO_2 & H_2O are reduced

c) CO_2 is oxidized & H_2O is reduced d) CO_2 is reduced & H_2O is oxidized

3) Number of pyruvic acids produced from one mobecule of glucose at the end of the glycolysis process-

a) One molecule b) Two molecules c) Three molecules d) Four molecules

4) The work that xylem tissue does in plants-

a) Water transport b) Transport of food

c) Transport of amino acids d) Oxygen transport

5) Food that is not digested in the human alimentary canal-

a) Dextrin b) Glycogen c) Phosphoprotein d) Cellulose

6) Through effective filtration pressure within the glomerulus, how much purified fluid is produced daily ?

a) 5 litres b) 180 litres c) 50 litres d) 100 litres

7) Which disease increases the amount of billirubin in the urine-

a) Tuberculosis b) Nephritis c) Jaundice d) Ulcers

8) Which of the following is the most acceptable theory regarding asent of sap ?

a) Root pressure theory- Scientist Hales b) Vitalistic theory - Scietist Jagadish Chandra Bose

c) Gaseous pressure and capilliary theory -Scienctist Botrum.

d) The theory of cohesion, transpiration, tension and adhesion of water-Scientist Dixon & Jolly.

9) Which of the following helps in the emulsification of fat within the digestive tract during fat digestion?

a) Lipase enzymes b) Bilirubin and biliverdin

c) HCl d) Salts of glycolic and torocholic acids

10) Which of the following is considered as a component of pancreatic juice ?

a) Peptidase, pepsine, amylase, rennin b) Amylase, pepsin, trypinogen, maltase

c) Lipase, amylase, trypsinogen, carboxypeptidase d) Amylase, peptides, trypsinogen, rennin

11) When two friends sit down to eat together and suddenly one of them starts caughing while eating, this incident can be called faulty work of which part -

a) Glottis, b) Epiglottis c) Tongue, d) Diphragm

12) Which information about human digestive tract is incorrect ?

a) Our four types of teeth help to cut, break & grind the food particles

b) When we take food of our choice, water comes to our tongue. This liquid is basically saliva.

c) The duct of the alimentary canal are muscular, which are rhythmically compressed to move food forward

d) Small intestine and esophageal cells cause mixture of HCl with ingested food.

13) Assertion : High blood pressure is called hypertension. This results in rupture of arteries and internal beeding

Reason : High blood pressure increases atrial constriction, increase blood flow resistance, results in rupturing of blood capillaries.

a) Both A and R are correct and R is not the correct interpretation of A

b) A is correct but R is incorrect

c) Both A and R are correct and R is the correct interpretation of A

d) Both A and R are incorrect.

14) Finger like amplifiers present in the inner part of the small intestine are called

a) Villi b) Pleura c) Kufr cells d) Bruner's cells

15) Which of the following is a saprophyte ?

a) Tape worm b) Mushrooms c) Leech d) Cuscuta

16) Identify the correct sentence

a) Plants donot produce excreta or waste products

b) Food transport in plants is mainly caused by xylem

c) Glucose and other respiratory substances are oxidized during respiration and provides energy in the form of ATP

d) Resin and gum are respiratory byproducts

17) Assertion : *Saccharomyces cerevisiae* is widely used in the bakery industry.

Reason : Flour swells due to the presence of CO_2 caused by fermentation, so yeast is used to make bread and cakes.

a) A and R both are correct and R is the correct interpretation of A

b) A and R both are correct but R is not the correct explanation of A

c) A & R both are incorrect

d) A is correct but R is incorrect

18) Liver and pancreas are two very important glands in our body. Although the liver doesnot secreate digestive juice directly, it is the largest digestive gland in the body and the pancreaas is the second largest gland. Which the following statements is not true about liver and pancreas ?

a) The pancreas is a mixed gland which has both external and internal functions

b) Bile is produced in the liver and keeps the bile in the gallbladder for a temporary period

c) Although the pancreatic juice enzymes paticipate in the digestion of sugars, proteins and fats, the liver helps in the digestion of fats by forming an insoluble form of bile and bile salts.

d) The pancreas and liver together regulate RBC production, haemoglobin formation and the amount of insulin and glucagon in the blood.

19) Assertion : The wall of the left ventricle of the heart is thicker than the right ventricle.

Reason : The right ventricle carries blood through the pulmonary arteries to the nearby lungs.

a) Both A and R are correct and R is the correct interpretation of A

b) Both A and R are correct and R is not the correct interpretation of A

c) A is correct but R is wrong

d) A and R both are wrong

20) Which process is not an excretory technique of plants ?

a) Transpiration b) Latex emissions c) Bark release d) Leaf abscision

B. Fill in the blanks : Mark-1

1) Carbon and energy needs of autotrophic organisms is filled by _____.

2) During photosynthesis, photons of sunlight are absorbed by _____.

3) The opening or closing of stomata is a function of _____ cells.

4) In terrestrial plants, water is absorbed from soil during photosynthesis with the help of _____.

5) Nature of food intake and feeding process in different multicellular organisms is different, hence the have_____ organisations.

6) The amoeba feeds with the help of its like finger like projections is called ___.

7) Salivary _____ is the enzyme which breaks down complex starch molecules into simple sugars.

8) Teeth are damaged due to ___ and ___.

9) Breakdown of pyruvic acid during aerobic respiration occurs within the _____ of cells.

10) Free energy is used for synthesis of _____ during cellular respiration.

11) To liberate CO_2 from the body, deoxygenated blood reach the lungs through ___ from the right ventricles.

12) In the case of vertebrates, blood flows through the heart twice during each cycle of circulation, which is called _____.

13) Normal systolic pressure is equal to _____ mm of mercury.

14) The release of water from the aerial parts of plants in the form of water vapour is called _____.

15) Adult human body produces _____ litres of urine everyday on an average.

C) Answer the following questions in one sentence or one word : Mark-1

1) Which is the main metal element necessary in the formation of chlorophyll?
2) Which color does iodine produce in the presence of starch?
3) How is the opening or closing of the petals controlled?
4) Nitrogen is an essential elements for the synthesis of any organic molecule?
5) What is pleura?
6) Which artery carries CO_2 rich blood?

7) Which blood cell helps to stop bleeding in the cut part of the body?

8) How translocation occurs in plant ?

9) Which part of the nephron is called utrafiltrate organ?

10) Write the names of two anaerobic organism?

11) Pneumatophore is found in which plant?

12) Write the names of the respiratory organs of earthworms and frogs?

13) What are the human respiratory muscles?

14) What is Diffusion?

15) Write the names of the living ingredients of xylem and the dead ingredients of phloem?

16) Why does urine smell bad ?

17) Write the name of the duct connecting the kidney and the bladder?

18) What is nephridia?

19) Which WBC builds immunity in the body?

20) Valamen is found in which kind of plant?

D) Write very short answer of the following questions : Marks -2

1) How many types to teeth do we have ? Specify the number of each type of teeth.

2) Which part of our tongue receives which taste?

3) What is symbiotic nutrition? Is there any sympiotic microorganism in the human body?

4) Write the difference between holophytic & holozoic nutrienion..

5) What is the role of HCl in our stomach?

6) What advantages does terrestrial organisms get over aquatic organisms in respect of obtaining oxygen for respiration?

7) Why SA mode is called pacemaker?

8) Write the importance of lymph in circulation in human body?

9) Write the difference between xylem and phloem?

10) What is venous heart? Which animals are seen?

11) What are the conditions for self-sufficient nutrition?

12) What other excretory organs are there in the human body besides the kidneys for excretion? Mention the function of any one of these organs?

13) Why does itching occur in the throat when we eat arum? How such itching can be stopped?

14) Write two differences between respiration and breathing.

15) Why are plant resins and gum important in our daily life?

E) Short answer type questions : Marks-3

1) Write the differences between plant nutrition and animal nutrition. Give one example of symbiotic nutrition in case of plants.
2) Prepare a list of plants plants' macronutrients and micronutrients. Define hostoria.
3) Protein gets digested in our stomach, but why does the wall of the stomach never get digested even though it is composed of protein. Define peristasis.
4) How does different type food get digested in our small intestine? Ilustrate with the role of enzymes.
5) What is energy currency? Show the glucose beakdown pathway or make a flowchart for glycolysis.
6) Draw a labelled diagram of human respiratory system.
7) Describe the different changes that occurs during inspiration and expiration.
8) Draw a neat and labelled diagram of human excretory system.
9) Write the role of saliva in digestion of food. State two disorders of our alimentary tract.
10) What will happen if the haemoglobin level of our blood get decreased? Write the roles of valves in our heart.
11) How plants gets the necessary raw materials for photosynthesis? What is compensation point?
12) Explain the urine formation procedure highlighting tubular reabsorption and secretion of nephron.
13) 'The existence of animal kingdom would be life threatening, if the plants get destroyed' - explain.
14) Differentiate between aerobic and anaerobic respiration. What is fermentation?
15) What are the different ways of excretion in plants ? Name two plant alkaloids along with their economic importance.

F) Long answer type question : Marks-5

1) How does ascent of sap take place in plants? Make your argument regarding transport of substances through xylem vessels and phloem vessels.
2) Explain the process of circulation in human heart with a neat diagram.
3) Draw a neat diagram of nephron and write the functions of different parts of nephron.
4) How are alveoli designed to maximise the exchange of gases? Describe the oxygen transport mechanism in our body.

Chapter 7

Control and Co-Ordination

Chaptere at a glance :

1) The nervous system and the hormones control and co-ordinates all the physiological functions of our body.
2) In animals, nervous system plays the major role in co-ordinating different types of cells and tissues and organs.
3) Through nervous system we give response to any external or internal stimulation.
4) Nervous system maintains a definite relationship between animal and environment and it controls the functions of different sense organs.
5) Our nervous system mainly consists of Neuron, Neuroglia, Nerves, Ganglia and Synapse.
6) Nerves have triple layer of connective tissues. (endoneurium, perineurium, epineurium).
7) Nerves are of three types - Sensory , Motor and Mixed.
8) At the junction of two neurons, synapse is formed through which nerve impulse is transmitted by the help of chemical substances called neurotransmitters.
9) Neuron is the structural and functional unit of nervous system. It has two parts - Soma and Processes. Processes are further divided into two catagories - dendron (recieves nerve impulse) and axon (carries nerve impulse).
10) There is a fibrous covering outside the whole central nervous system, called meninges. Cerebro Spinal Fluid (CSF) is present in ventricles of brain, central canal of spinal cord and sub-araconoid space of meninges. CSF is colourless, transparent and slightly basic in nature.
11) In higher vertebrates nervous system and endocrine system functions in co-ordination with each other.
12) Endocrine glands help in chemical control and co-ordination in our body. Hence, hormone is called the chemical coordinator of our body.
13) Chemical co-ordination is observed in both plants and animals.
14) Hormones are produced in a particular body part and are transported to another body part to achieve the intended result.

15) Hormonal functions are controlled by feedback mechanism.

16) All the physiological functions in plants are controlled and co-ordinated by phytohormones (Auxin, Gibberellin, cyto kinin, Ethylene, ABA) as they lack nervous system.

A) Identify the correct option from the following questions: Mark 1

1) If the movement of any part of a plant is caused by some chemical substance, then it is called –

a) Theremonastic movement. b) Chemonastic movement

c) Nictinastic movement d) Chemotropic movement.

Ans :

2) The leaves of touch me not plant get twisted when we touch it. It is an example of –

a) Nictinastic movement b) Sismonastic movement.

c) Chemonastic movement d) Hyponastic movement.

Ans :

3) which is gaseous hormone

a) Ethylene b) Auxin.

e) Dormin d) Cytokinin.

Ans :

4) Phytohormone that removes ancestral dwarfism in plant is -

a) Florigen b) Cyto kinin

c) Auxin d) Gribberellin.

Ans :

5) Salivation on the sight of the tasty food is an example of -

a) Unconditional reflex b) Complex reflex

c) Aquired reflex d) Simple reflex.

Ans :

6) Which of the following has hollow central nervous system –

a) Cockroach b) Leech

c) Human d) Hydra

Ans :

7) Which part of human brain helps in growth, memory, hearing, vision, smelling, tasting ?

a) Cerebral cortex b) Cerebellum

c) Pons d) Hypothallamus.

Ans :

8) Thyroxin deficiency in childhood causes - -

a) Mixiduma b) Goiter c) Cretinism d) Acromegally.

Ans :

9) Hormone that helps in maturation of froglets is-

a) Thyroxine b) Estrogen c) Ecdisone d) Insuline.

Ans :

10) Diabetis melitas is caused by.

a) Excessive secretion of ADH. b) Excessive secretion of insulin.

c) Deficiency of ADH d) Deficieney of insulin.

Ans :

11) The gap between two neurons is called -

a) Dendrite b) Synapse c) Axon d) impulse

Ans :

12) Brain helps in

a) Thinking, intellect, emotion. b) Muscle contraction & maintaining body balance.

c) Cardiac emotion & movement of iris. d) All of the above.

Ans :

13) Find out the incorrect statement from the following -

a) Fore brain is the regulatory centre for thinking or cognitive centre of our brain.

b) Brain resides within a chamber of bone, i.e., skull.

c) Body posture and body balance maintenance and voluntary functions etc, are regulated by medulla oblongata of our brain.

d) Thinking is a complex phenomenon, so nerve impulse from various neuron / nerves and their interaction controls the thinking phenomenon.

Ans :

14) Find out the correct statement -

a) Cytokinin helps in growth of stem.

b) Ethylene is responsible for the redemption in plants

c) Auxin inhibits the growth of root in plants.

d) Ethylene forms the abscission layer and inhibits the growth of plant.

Ans :

15) Which is the correct sequence of reflex ?

a) Receptors → Muscles → Sensory neuron → Motor neuron →Spiral cord.

b) Receptors → Sensory neuron → Spinal cord → Motor.

c) Receptor → Spinal cord → Motor neuron → Sensory neuron → Muscles.

d) Receptor → Sensory neuron → Spinal cord → Muscles → Motor neurons

Ans :

16) Which of the following pair is correct ?

a) Adrenalin: Pituitary gland b) Estrogen: Testis c) Vagus nerve: Cranial nerve

d) Reflex action : Darwin

17) Assertion (R) : During very cold season secretion of adrenalin increases in developed vertebrates
Reason: Adrenalin maintains the body balance by increasing the metabolic rate of muscle cells and liver cells.

a) Both A and R are true and R is the correct explanation for A.

b) Both A and R are true but R is not the correct explanation for A.

c) A and R both incorrect.

d) A is correct but R is incorrect.

Ans :

18) which part of cerebrum controls hearing

a) Occipital lobe b) Frontal lobe

c) Parital lobe d) Temporal lobe,

Ans :

19) Assertion (A): STH (or GH) is as important for growth of babies.
Reason (R): In childhood excessive secretion of this causes dwarfism and deficiency causes gigantism.

a) A and R both are correct and R is the correct explanation for A

b) A and R both are correct but Ris not the correct explanation for A

c) A is correct but R is incorrect

d) A and R both incorrect.

Ans :

20) To prevent which disease iodine is added –

a) Scurvey b) Ricket

c) Goiter d) Adison's disease.

Ans :

B) Fill in the blanks : 1 Mark

1) Control and co-ordination in animals is accomplished by _____ and _____

2) Our eyes, ear and nose has to recieve from environment _____ .

3) The nerve impulse reciered by den drite produces _____ after a series of chemical reactions.

4) _____ is a complex process, hence it has a _____ interaction with the nerve impulse coming from many neurons.

5) The motor neurons coming from whole body meets at _____ bundle in the way to brain

6) Central nervous system consists of brain & _____

7) Brain is the primary _____ centre of the body.

8) Cranial nerves produced from brain and _____ nerves produced from spinal cord combinet form _____ nervous system.

9) _____ of brain is the main contemplation - controlling centre.

10) Blood pressure, salivation and all involuntary functions are controlled by - part of hind brain.

11) Impulse from one plant cell to other plant cell is transported as _____.

12) Different _____ helps in co-ordination of plant growth and it provides environmental _____ to the plant.

C) Answer in one word or in one sentence: Mark-1

1) Roots of plants grows towards the water source . What type of movement is this?

Ans:

2) Which hormone controls tropic movement in plants?

Ans:

3) Which type of movement is seen in insectivorous plants?

Ans:

4) What is tactic movement ?

Ans:

5) The blades of banana leaves and coconut opens slowly. What type of movement is this?

Ans:

6) To prevent the redemption of immature parts of plant, which hormone is used?

Ans:

7) What is the name of the process of production of seedless fruits?

Ans:

8) Why neuron does not undergo division?

Ans:

9) What are the primary functions of hypothalamus?

Ans:

10) 'The urge of breastfeeding in new-born babies'. What type of reflex action is this?

Arr:

11) Name the longest and shortest processes of neuron.

Ans:

12) Which part of hind brain controls walking in a straight road ?

Ans:

13) On an increased blood sugar level, secretion of which horomone increases to decrease the blood sugar revel?

Ans:

14) Why iodine is important in edible salt ?

Ans:

15) Which parts are referred to as master gland and master of master gland?

Ans

16) What is nerve impulse ?

Ans:

17) What are the components of central nervous system?

Ans:

18) which hormone is referred to as emergency hormone or 3F (Fight, Fear, Flight) hormone ?

Ans:

19) Write down the cause of diabetes melitas and diabetes insipidus ?

Ans:

20) Write the full form - GnRH, ACTH.

Ans:

D) Very shout answer type question : **Marks 2**

1) What is the difference between the movement of leaves in sensitive plants and the movement of stem towards the source of light ?

Ans:

2) Write down the names of different types of tropic movement in plants ?

Ans:

3) Write down the name of receptors present in our eyes, ears, tongue, and nose ?

Ans:

4) How electric impulse is transported through synapse?

Ans:

5) What is the function of cerebrum in humans?

Ans:

6) What is natural reflex action. Give example?

Ans:

7) How can we smell the fragrance of incense stick?

Ans:

8) Which horomone helps in ripening of fruits? Which phyto hormone causes the redemption of immature parts?

Ans :

9) Why pancreas is called mixed gland ?

Ans:

10) What is parthenocarpy? which hormone helps in germination of seeds?

Ans:

11) which type of tropic movements are observed in leaves, stem and root of plants?

Ans:

12) Write down the difference between axon and dendron.

Ans:

13) What is tropic hormone ? Give an example.

Ans:

14) Which endocrine gland is called the master gland? Which part controls the functions of master gland?

Ans:

15) What is releasing hormone ? Explain with examples?

Ans:

E) Short answer type question : **Marks-3**

1) Write down the differences between neuron and neuroglia ? What is neurotransmitter? (2+1)

2) Through one example, explain the co-ordination among the works in our daily life. (3)

3) What are the components of an ideal reflex arc? Show in a clear diagram. (1+2)

4) Write down the location and function of cerebrum, hypothalmas, cerebellum. (1+2)

5) What is synapse ? Explain its structure with diagram? (1+2)

6) What is the chemical name of auxin hormone ? Write down its practical applications in horticulture?

7) Which hormone is present in liquid grain of coconut ? Write down its functions. (1+2)

8) Explain phototropic movement in plants ? (3)

9) How involuntary functions and reflex action are different from one another ? Where is the nerve centre of reflex action present ? (2+1)

10) Write down the functions of receptors in our body? Where effector place is present ? (2+1)

11) How chemical co-ordination is accomplished in animals and plants ? (2+1)

12) Make an experimental diagram to show hydrotropic movement in plants? (3)

13) Write down the differences between unconditional and conditional reflex action with examples? What is the role of brain in reflex action? (2+1)

14) Write down the functions of Schwann cell, nodes of ranvier and myelin sheath. (2+1)

15) How the control and co-ordination between various physiological functions in our body is accomplished by nervous system and endocrine system ? (3)

F) Long answer type questions: **Marks 5**

1) What events occur in the junction between two neuron i.e., the synapse ?

Or,

Explain the transportation of nerve impulse through synapse. (5)

2) Draw a labelled diagram of an ideal neuron and write down its function ? (3+2)

3) Which functions will be disrupted due to injury in spinal cord. Draw a labelled diagram of a reflex arc ? (2+3)

4) (a) Why a patient suffering from diabetis melitas is treated with insuline injection ? (1)

(b) Write down the causes of dwarfism and gigantism? (2)

(c) Write down two differences between hormone and enzyme ? (2)

5) (a) What is the primary difference between tropic movement and nastic movement in plants?

(b) Growth of pollen tube to towards the ovule - what type of movement is this?

c) Explain briefly about different types of tropic movements in plants? (1+1+3)

Chapter 8 How do organisms reproduce?

Chapter at a glance:

1. Reproduction is not essential like other life process. But if the reproductive system of all of the individual of a species get destroyed, then the species would be extinct from the biosphere.
2. Organisms can maintain the hereditary existence through reproduction within their population. Decrease in population size due to death, may be overcome through reproduction.
3. Cells involved in reproduction, get engaged in DNA replication and thus form new cellular mechinary for reproduction.
4. Reproduction in organism are of mainly two types- asexual and sexual reproduction. Though in some plants vegetative propagation and in some organisms parthenogenesis may occur.
5. Many bacteria, protazoas can produce two or more offspring through fission.
6. Hydra, yeast reproduce offspring through the formation of bud. Hydra, planaria can form new individuals from fragments of their body through the process of fragmentation.
7. Some plants complete their vegetative propagation by sub-aerial roots, adventitious leaf buds, modified stem. Through artificial vegetative propagation some parts of plant body may get detached or cut and can produce new offspring to get more flower or fruits.
8. In sexual reproduction, there should be two sexually different organism. But in hermaphrodite animal, sexual reproduction may complete within a single body through the union of two different gametes.
9. In flowering plants during sexual reproduction, pollen from the anther get transferred to the stigma of pistil to complete double fertilization through pollination, pollen tube formation & fertilization. After double fertilization, diploid zygote (2n) and triploid endosperm (3n) will form within the embryo sac.
10. The ovary matures into fruit and the ovule modifies into seed after double fertilization.
11. In human beings at the onset of puberty, sexual hormone secretion, activation of the gonads, gametogenesis and secondary sexual characteristics develops.
12. The male reproductive system is composed of testes (primary sex organ), vas deferens, seminal vessicles, ejaculatory ducts, prostate gland, cowper's gland, urethral gland and penis (secondary sex organs).

13. The female reproductive system is composed of ovary (primary sex ongan), fallopian tube, uterus, vagina, vulva bartholine gland and mammary gland (secondary sex organs).

14. During sexual intercourse, the ejaculated sperm swims from vagina to the ampula of the fallopian tube and fertilize the ova (secondary oocyte) present there. The fertilized ova (zygote) differentiates through cleavage (mitotic division) into morula, then blastula, then gastrula, and finally into embryo.

15. Syphilis, gonorrhoea, AIDS, trichomoniasis etc., are sexually transmitted disease (STDs).

16. Pre-marietial knowledge about own body parts, experiments, sex education, safe sexual life, heredity and genetics etc., are important part of our life now and to know the scientific knowledge one must adopt family planning.

17. Use of condom, diaphragm, Cu-T, oral contraceptive pills may reduce the chance of pregnancy though these are temporary measures. One can adopt operative way (vasectomy or tubectomy) as permanent measures for birth control.

A. Choose the correct answer from the following questions: Mark-1

1. Which is the correct sequence of sexual reproduction in flowering pants ?

a) Pollination → Double fertilization → Embryo → Sprouted seedlings.

b) Pollination → Sprouted seed → Embryo → Double fertilization

c) Embryo → Sprouted seed → Pollination → Double fertilization.

d) Double fertilization →Pollination → Embryo → Sprouted seed.

2. Among the following organisms, who reproduce by asexual reproduction -

a) Dog.

b) Yeast

c) Amoeba

d) Penicillium

i) a, b (ii) b, c & d (iii) c, d (iv) all of these

3. The part of the plant body that has the ability to produce offspring-

a) Stems, roots & flowers.

b) Stems, leaves & flowers.

c) Stems, roots & leaves.

d) Stems, flowers & fruits.

4. Which statement is correct in case of flower ?

a) Flowers are always bisexual.

b) Flowers are the sexual reproductive organ of plant.

c) Flowers bloom in all kinds of plants.

d) After double fertilization, the fruit is formed from the ovary of the flower.

i) a, b (ii) b, d (iii) All of these (iv) None of these

5. In which type of asexual reproduction, callus is formed in plants –

a) Vegetative reproduction

b) Fragmentation

c) Regeneration

d) Micro propagation

6. Reproduction by budding is found in –

a) Yeast & Euglena

b) Chlamydomonas & Diatom.

c) Yeast & Hydra.

d) Hydra & Planaria

7. The type of reproduction which helps in biological adaptation is -

a) Vegetative propagation

b) Asexual reproduction

c) Parthenogenesis.

d) Sexual reproduction.

8. The union of two unequal shaped gametes is called –

a) Plasmogamy

b) Isogamy

c) Anisogamy

d) Oogamy

9. Conjugation is seen in –

a) Moss b) Fern c) Spirogyra d) Rice

10. When the pollen tube enters the embryo sac through micropyle, then it is called –

a) Porogamy b) Chalozogamy c) Mesogamy d) Besogamy.

11. In a bisexual flower if gynoecium matures before androecium, then it is called –

a) Protogyny b) Protandry c) Herkogamy d) None of these

12. Choose the right answer(s) for the human reproductive system.

a) Testis is the main male reproductive organ

b) Each ovary of a new born girl child contains some egg and follicles.

c) In mother's womb, the developing embryo get nutrition through placenta.

d) Copper-T is a type of contraceptive medicine.

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

13. Which of the following is not a part of the female reproductive system in human beings?

a) Cervix b) Vas deferens c) Fallopian tube d) Uterus.

14. Which is the incorrect option with regard to testosterone hormone?

a) Interstitial cells of Leydig present inside the seminiferous tubules of testis secretes testosterone.

b) During puberty increased secretion of the testosterone hormone leads to development of secondary sexual characteristis.

c) By stimulating the cells of the seminiferous tubule spermatogenesis is caused.

d) Accumulation of fat in different parts of the body leads to softening of the body.

15. Assertion: Testes remain outside the body in a sac like structure called scrotum with the help of spermatic cord.

Reason: Sperms are produced in the seminiferous tubules of the testes present inside the scrotum where temparature is 2-4^{0}C lesser than the body temparature.

a) Both Assertion & Reason are connect

b) Assertion is correct but Reason is wrong

c) Reason is not the correct explanation of assertion

d) Both Assertion & Reason are wrong.

16. Sexual intercourse is always a possibility of fetal transmission. If a woman is not physically and mentally ready for conception, then various types of scientific contraceptive measures can be taken to avoid miscarriage. In this context which is the incorrect of the following options.

a) Vasectomy is performed by cutting off the vas deferens from the epididymis of both testis in men.

b) By using of condom or diaphragm one can prevent sperm from reaching the ovary.

c) Oral contraceptive pills have no side effects so it is safe to use.

d) Intra uterine device like Cu-T can be placed inside the uterus to prevent pregnancy for 2-3 years.

17. Assertion : A sexual reproduction produces a large number of offsprings, which are same as their parents. The offsprings are called the parent's clone. There is a possibility of extinction in adverse environment, because there is no variation between the offspring.

Reason : There is no variation because reproduction is completed without meiosis divison and syngamy.

a) Assertion is correct but reason is incorrect.

b) Assertion is incorrect but reason is correct.

c) Assertion & Reason both are correct & reason is correct explanation of assertion.

d) Assertion & Reason both are correct but reason is not correct explanation of assertion.

18. In which of the following sperms are stored & collect nutrient from –

a) Cowper's gland

b) Epididymis

c) Seminiferous tubule

d) Vas deference

19. Which of the following sexually transmitted disease & pathogens pair is correct ?

a) AIDS- *Bacillus anthracis*

b) Gonorrhea - *Leishmania donovani*

c) Urethritis - *Entamoeba gingivalis*

d) Syphilis - *Treponema Pallidum.*

B. Very Short Answer type questions : **Mark-1**

1) Name a parasite that can be seen to perfom asexual reproduction by multiple fission ?

2) What is the unit of a sexual & sexual reproduction ?

3) Regeneration is seen in which organism ?

4) Write the name of a plant that completes vegetative reproduction by leaf bud & orbital bud ?

5) Parthenogenesis is seen in which organism ?

6) Which organism reproduces by offset formation ?

7) In which bisexual organism needs another organism for reproduce & why ?

8) Self fertilization is seen in which animal ?

9) Which is an advanced stock or scion in the case of artificial reproduction in the grafting process ?

10) What is amphimixis ?

11) Why are germ cells of flowering plants not called sperm ?

12) What is graffian follicle ?

13) Name two sexually transmitted diseases ?

14) Which day is celebrated as 'AIDs Prevetion Day'?

15) What is the role of estrogen in child's birth ?

16) Which hormone is present in the contraceptive pills ?

17) After fertilization,the blastula formed from the zygote gets implanted at which site of the uterus?

18) After fertilization the zygote transforms into an embryo through which phase ?

19) Which is the national symbol of family planning in India ?

20) Which phase of menstrual cycle is known as safe contraceptive phase ?

21) What is menarche ?

22) A woman is using Copper-T. Will it prevent STD infection in the woman's body ?

C. Short Answer type questions: **Marks -2**

1) What is the difference between vegetative propagation and asexual reproduction ?

2) What is parthenogenesis ? Give example.

3) How does pollination differ from fertilization?

4) What is puberty ? When does it happen in boys & girls ?

5) How does binary fission occur in amoeba?

6) What is grafting ? How can it be done ?

7) What do you think that if an organism reproduce by, spore how will it help the organism ?

8) What kind of cell division can be seen during gametogenesis ?

9) Which type of pollination requires the presence of vector ? Name the triploid (3n) cell which is formed after double fertilization.

10) Mention the secretory source of testosterone & oestrogen ?

11) What is the nature of human placenta ?

12) What will happen if mensturation does not occur ?

13) What is menarche & menopause ?

14) Under which condition reproductive health can get affected ?

15) Why is sex ratio decreasing in India ? Name two permanent sterilization method.

16) Name a virus & bacteria that causes sexually transmitted diseases & the name of the diseases caused by them ?

17) What is spermatogenesis ? Which hormone regulate this process ?

D. Answer the following questions briefly : **Marks -3**

1) What are the benefits of sexual reproduction over asexual reproduction ?

2) Draw a labelled diagram of longitudinal section of a flower ?

3) Discuss the importance of maintaining reproductive health ?

4) Write briefly about the physical changes in boys & girls during puberty.

5) Write four differences between binary fission & multiple fission ? Can we say that, the reproductive units those are generated in multiple fission are true spores ?

6) What is the importantce of DNA replication in reproduction ? What would you observe if you soak a piece of bread in water & leave it in a dark, cool, humid place for two days?

7) Draw a labelled diagram of the human female reproductive system ?

8) From where estrogen is secreted ? Write three functions of it ?

9) Write the difference between self-pollination & cross pollination.

10) Explain the process of budding in yeast. What is syngamy ?

11) Why artificial vegetative propagation is done in some plants ? Do you think that in this case variation can be seen in offsprings ?

12) Write the difference between conjugation & fertilization ? Name two organisms in which internal and external fertilisation can be seen.

E. **Match the column A with B**

Column-A	**Column-B**
a) Fleshy roots	i) Helps to convert immature sperms into mature sperm
b) Stock & scion	ii) Determines the chromosomal abnormalities & sex of the fetus
c) Tissue culture	iii) Contraceptive pills
d) Amniocentesis	iv) Helps in vegetative propagation
e) Sertoli cell	v) Grafting
f) Saheli	vi) Generation of offspring by tissue culture

14) Briefly explain the different methods of contraception.

F. Long Answer type quesitons : **Marks -5**

1) Explain double fertilization process of flowering plants with a suitable diagram.

2)(a) Show different parts of the male reproductive system through the flow chart.

(b) Write about the importance of seminal vesicle & prostate gland?

3)(a) Explain the process of budding in hydra ?

(b) Discuss the regeneration process of planaria flat worm with suitable diagram.

4) (a) What is spermatogenesis ? Where it occurs?

(b) Write down the importance of family planning to maintain reproductive health.

Chapter 9

Heredity and Evolution

Chapter at a glance :

1) The basis of heridity is the process of inheretance by which the traits and characteristics of an organism are properly transmitted from one generation to the next.
2) Due to inherritance from the earlier generation, new generation shows a common body physique and almost all kinds of changes or characters similar to their parents.
3) Changes due to inheritance from first generation to second generation organism are called variation, that are passed down through the generations and form diversified organisms. In case of asexual reproduction, the offsprings from the first generations may have very little changes in their DNA.
4) In asexually reproducing organism, variations occur due to slight error in DNA replication. But in a sexually reproducing organism, variation is caused by a combination of DNA from two different organisms, so the change is greater and huge diversity is observed in such organisms.
5) Many scientists have done experimental studies on pea plants and other living organisms before Gregor Johann Mendel (1822-1884). But Mendel studied different characteristics of pea plants combining scientific and mathematical science. He recorded the typical characteristics of first generation and followed this through successive generations, hence he got the success.
6) Mendel studied one pair of contrasting character of two different pea plants of the same species. The type of hybridization techniques applied by Mendel in his experiment for one gene, is called monohybid cross.
7) In the case of hybridization, he created offspring by hybridizing a tall plant (with TT genotype) and a dwarf plant (with tt genotype). Though all plants in the F_1 generation were tall (Tt), self pollination of F_1 generation offsprings resulted in $^1/_4{}^{th}$ dwarf plants in F_2 generation. Means, offsprings of F_2 generation are expressed in 3:1 ratio with respect to tall and dawrf plants. This ratio is called phenotypic ratio. Some of the tall plants were with TT genotype and some with Tt genotype. So,

ratios of TT, Tt and tt geneotype of F_2 generation was 1:2:1 and this ratio is called genotypic ratio.

8) In sexually reproducing organisms there are two alleles of a gene for the same character. If the copies are not identical, then the expressed allele is called dominant allele and the unexpressed allele is called recessive allele.

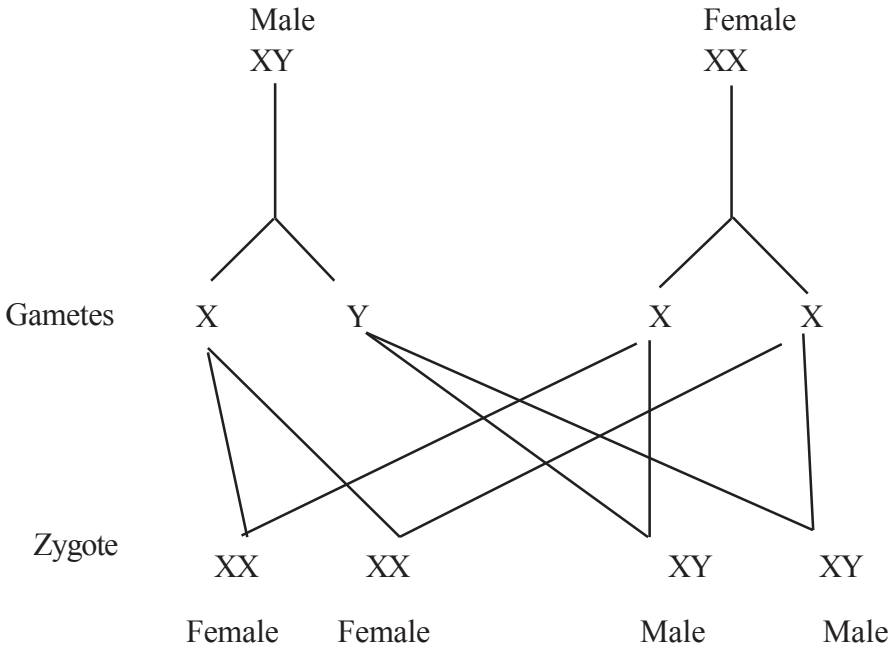
9) In the case of dihybrid cross, Mendel studied hybridization of two pairs of opposite characters of pea plant that involves inheritance of two genes in which seed color and seed shape are two distinct characters- round yellow, round green, wrinkled yellow and wrinkled green were independently assorted, resulting into the phenotypic ratio 9:3:3:1.

10) Sex determination are of different types for different animals. In case of some animals such as reptiles, the temperature at which the fertilized eggs are kept, determines whether the fertilized egg will be male or female. In case of some other organisms such as snails, each organism can change its sex, meaning that the sex is not genetically determined in all these organisms.

11) But in human beings the sex is genetically determined. Each human body cell has 23 pairs of chromosomes, out of which 22 pairs are autosomes and one pair is of sex chromosomes. The sex chromosome is XX in women but is XY in men.

So from this, it is clear that if the child gets the X chromosome from the father, then the baby is a girl child and if the baby gets the Y chromosome, then the baby is a boy child.

12) The inbuilt tendancy of different organisms to undergo variation occuring due to mutation during DNA replication and sexual reproduction, helps that species to survive and also helps in genetic drift.



13) As the genes control the inheritable characteristics generation after generation, so one can say that, rate of repeatation of those genes may alter from one generation to another generation, which may fluctuate and it is the basis for evolution.

14) On the other hand, changes in non reproductive tissues under the influence of environmental factors are never transmitted to the DNA of germ cells. And therefore due to this the traits or characters acquired during the life of an organism cannot be transmited to the offspring and here it cannot relate to the evolution.

15) When variation is linked with the geogrpphical isolation then it might progress for speciation.

16) The more similar the characteristic of the two species, the closer they will be and the closeness of their characteristics related to their common ancestor woulde be recent. That is, we can say that classification of species is basically a reflection of their evolutionary relationship.

17) If we search our common ancestors, then we will gain the knowledge that, once upon a time life was originated from the non living or inorganic substances.

18) When try to observe the evolutionary relationship, we find some common traits in different animals. For example , basic structure of fore limbs of birds, reptiles, amphibians and mammal are almost same, but they perform different functions. These are called homologous organs which help in indentifying the evolutionary relationship between two different species. Although both the wings of a bat and the wings of a bird are used for flight, but the origin and structure of the limbs are not same. So they are not homologous, but are analogous organs.

19) The study of organ structure is not only limited to the modern species, through the study of fossils we can get an idea about evolution from the extinct organisms also.

20) For survival on this earth or nature and to be fittest in the changing atmophere, the organs become more complex. Example-adaptation of wing and eyes of different animals.

21) During evolution, the organs of living organisms get adapted to perform new functions. For example, feather development in the wings of birds, primarily resembles to store energy, but later these were adapted to help in flight.

22) For more than two thousand years people have been cultivating wild cabbage as a food plant and through artificial selection we produced different types of vegetables like broccoli, cauliflower, cabbage, etc.

23) In fact, the concept of evolution does not lead to any real inprovement, but only creates diversity and that diversity is determined by environmental selection.

24) To search out the relationship of evolution the used factors would be digging, study of fossils, autoradiography of fossils and simultaneously sequencing of DNA molecules etc. These are used to study the human evolutionary pathways.

24) In case of humans, skin colour of some are yellow, some are black, some are white or brown, but all humans belong to a single specis. Not only that, regardless of where we have lived for the last few thousand years, it can be said that we all came from Africa.

A) Choose the correct option from the following questions : Mark-1

1) The plant that Mendel used in experiments of heredity was -
   a) Touch me not plant b) Peas c) Paddy d) Rases
2) The idea of the evolution of species with the help of natural selection theory was given by -.
   a) Mendel b) The odre c) Robert Hooke d) Darwin
3) Mendel studied how may pairs of contrasting characteristic in peas ?
   a) 12 pairs b) 3 paris c) 7 pairs d) 18 pairs
4) What is the phenotypic ratio of the F_2 generation in Mendel's monohybrid cross ?
   a) 3:1 b) 1:2:1 c) 2:1:2 d) 1:3:2:1
5) Which of the following genotypes is homozygous ?
   a) Tt b) Bb c) tt d) Rr
6) When only one of two opposite characters is expressed, it called -
   a) Recessive character b) Dominant character
   c) Incomplete dominance d) None of these
7) In case of humans, what is meant by a normal man ?
   a) XY b) XX c) XXY d) XO
8) The following genotype refers to green and wrinkled pea seeds –
   a) RrYy b) rrYY c) rrYy d) rryy
9) The fossils of invertebrate –
   a) Ammonite b) Knightia c) Rajasaurus d) None of these.
10) Which of the following effects can give rise to a new species ?
   a) Genetic drift b) Natural Selection c) Geographical isolation d) All of the above
11) Which of following is not an inherited character ?
   a) Hair fomation in the earloble b) Ability of cycling
   c) Development of physical height d) Blood grouping
12) Which scientist was the first to say that life has originated from simple inorganic molecules present on earth?
   a) Miller (b) Vries (c) Mendel (d) H
13) What kinds of organs are the wings of a bat and the wings of a bird?
   a) Homologous organs b) Analogous organs c) Inactive organsd) Transplanted organs

14) The type of selection by which different types of vegetables originated from wild cabbage, is –

a) Natural b) Artificial c) Both option 'a' and 'b' are correct d) None of these

15) What is the Scientific name of the present man?

a) *Homo erectus* b) *Homo habilis* c) *Australopithecus* d) *Homo sapiens*

Fill in the blanks : **Mark-1**

1) Flowers of a pea plant are ___.
2) The external features of an organism is called ___.
3) The ratio of Mendel's Monohybrid cross between TT, Tt and tt would be ___.
4) Gene is a part of ___.
5) XX Chromosome refers to the ___ child.
6) Removal of the tail cannot alter the _____ of the germ cells of the rat.
7) Scientist ___ had proposed the laws of inheritance in living organisms.
8) The preserved traces of living organism are called ___.
9) ___ was a proponent of natural selection theory.
10) ___ is synthesized from amino acids.

C) Write the following sentences as correct or wrong and correct the wrong answer :

1) The trait denoting tallness in peas is T. **Mark-1**

2) Humans have 22 pairs of autosomes and two pairs of sex chromosomes.
3) In the case of Mendel's monohybrid hybrid cross, all the pea plants of F_1 generatoin were tall.
4) The part of DNA that gives information for making proteins is called gene.
5) If a human sex chromosome has a Y chromosome, it refers to female.
6) The idea of genetic drift is that diversity occurs without any adaptation.
7) Darwin was a naturalist.
8) Anterior limbs of frogs and lizards are examples of analogous organs.
9) Knightia is the name of a fish fossil.
10) Variation helps in the genetic drift.

D) Answer the following assertion and reason questions : **Mark-1**

a) Both assertion and reason are correct and the reason is the correct interpretation of the assertion.

b) Both assertion and reason are correct but the reason in not the correct interpretation of the assertion.

c) The assertion is correct but the reason is wrong.

d) The assertion is wrong but the reason is correct.

e) Both assertion and reason are wrong.

1) Assertion : Genes synthesize proteins.
   Reason : Genes are part of DNA.
2) Assertion : Peas had seven pairs of traits.
   Reason : Mendel used peas in his experiments.
3) Assertion : Tallness is dominant trait among the tall and dwarf features.
   Reason : It expresses the characteristic of the T Gene.
4) Assertion : X and Y chromosomes are sex chromosomes in humans.
   Reason : Mendel is called the father of genetics.
5) Assertion : The genotypic ratio of offsprings of F_2 generation in Mendel's monohybrid cross is 3:1
   Reason : The morphological feature of an organism is called phenotype.
6) Assertion : In the case of reptiles, the sex of the fertilized egg is determined by the temperature.
   Reason : Sex is not determined genetically in all organism.
7) Assertion : Natural selection in dung beetle population helps in the evolutionary pathway.
   Reason : As a result of adaptation, beetles have been able to adapt better with the environment.
8) Assertion : Darwin gave the idea of the evolution of species with the help of the theory of natural selection.
   Reason : Darwin was first to give the idea about evolution.
9) Assertion : Organs which are structurally same but functionally different are called homologous organs.
   Reason : The ancestor of every creature was present in the same place.
10) Assertion : Insects, and birds' wings are analogous organs.
    Reason : If the organs are structurally different but functionally same, they are called analogous organs.

E) Answer the following questions in one word: **Mark-1**

1) Which sicentist was the first to study inheritance by combining knowledge of Science and Mathematics?
2) What was the phenotypic ratio of F_2 generation in Mendel's monohybrid cross?
3) In Mendel's experiments what was the genotype of the tall pea plants.
4) The sex chromosomes of women are ___.
5) What is the unit of heredity?
6) Who is the proponent of natural selection?

7) Name the organs of different animals which are structurally same but functionally different.

8) Name one of the methods used to determine the age of fossils?

9) Name one animal which has photosensitive eye.

10) Humans are organism from which continent?

11) What is the name of the unit of transmission of inheritance ?

12) What plant did Mendel use for his experiments on inheritance of living organisms ?

F) Answer the following questions :- **Marks-2**

1) Why are the wings of bat and the wings of a bird called homologous organs?

2) What is genotype?

3) Explain with an example that any trait or characteristics is controlled by genes.

4) What is DNA ?

5) What is variation?

6) What is chromosome? What are the human sex chromsomes?

7) Write two differences between dominant and recessive character?

8) What is gamete? Which sex chromosomes are present in human male gametes?

9) What is a phenotype?

10) What is a sub-population?

11) What is genetics?

12) Write the concept of genetic drift?

G) Short answer type questions : **Marks-3**

1) (a) Write down which of the following characters are inherited and which are acquired :

(i) The height of man

(ii) Rats whose tail has been removed by surgical treatment

(iii) The color of human skin

(iv) Beautiful handwring

(b) Write two differences between inherited characters and acquired characters.

2) In our society the mother is blamed for giving birth to a newborn baby boy or girl. Justify.

3) What is speciation? State two factors which are responsible for speciation.

4) Some grasshoppers of green and brown color lived together in a dry grass. Suddenly some birds came to the bush and ate some grasshoppers.

(i) Which of these grasshoppers can be eaten by birds and why?

(ii) What type of grasshoppers will increase in number in these bushes?

(iii) What is this phenomenon called- natural selection or genetic drift ?

5) In case of hybridization of a plant with blue flowers (BB) and a plant with white flowers (bb) of the same species-

(A) What color flowers do you think can be found in F_1 generation ?

(B) If the plants are obtained by selfing in the F_2 generations, then what will be the ratio of BB, Bb and bb in F_2 generation?

(C) Why is this type of hybridization called monohybrid cross?

6) Explain how diffrent types of vegetables were produced from wild cabbage through artificial selection.

7) Explain why it is not right to equate evolution with the progress of an organism

8) Birds, reptiles, amphibians and mammals have four limbs (two arms and two legs). These organs are structurally same, but functionally different and helps to identify the evolutionary relationship between two difference species.

Read the description above and answer the questions given below -

(A) Name the type of organs which are structurally same but functionally different in different organisms.

(B) What are the different types of organs in different animals that have different structures but similar functions?

(C) How the study of such organs help in identifying the evolutionary relationship.

(H) Long answer type questions : **Marks-5**

1) What are genotypes and phenotypes? In Mendel's monohybrid cross, mention phenotypic and genotypic ratio of the F_2 generation. A father with blood group B and a mother with blood group O, gave birth to a daughter with blood group O. Is this information sufficient to tell whether blood group B or O is dominant? Justify your answer.

2) How can Mendel's experiments be used to show that the traits are independently inherited.

3) What is an autosome? Explain how sex is determined in humans?

4) Explain Mendel's monohybid cross with the help of a checker board upto F_2 generation.

5) Write two differences between homologous and analogous organs. Explain how the fossils help to determine evolutionary relationships?

6) How are organisms organized? What is an autosome?

7) Briefly discuss about human evolution. What is the scientific name of man?

------000------

Chapter 10

Light-Reflection and Refraction

Chapter at a glance:

- Light is a form of energy.
- If an opaque object on the path of light becomes very small, light has a tendency to bend around it and not travel in a straight line; this effect is known as diffraction of light.
- Reflection: When light passing through a transparent and homogeneous medium is incident on another transparent and homogeneous medium then, a portion of light from the surface of the second medium returns to the first medium changing its direction. This phenomenon is called reflection of light.
- Reflection of light obeys two laws.

First law: Incident ray, reflected ray and the normal drawn to the reflecting surface at the point of incidence lie on the same plane.

Second law: The angle of reflection is always equal to the angle of incidence.

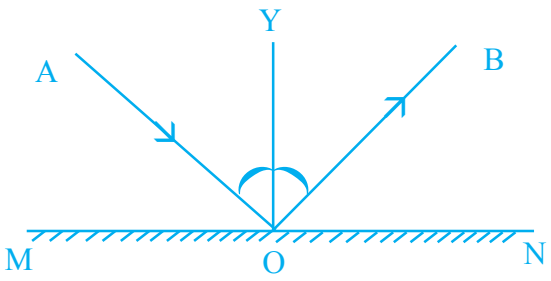
AO= Incident ray

OB= Reflected ray

OY= Normal

MON= Reflector

0= Point of incidence

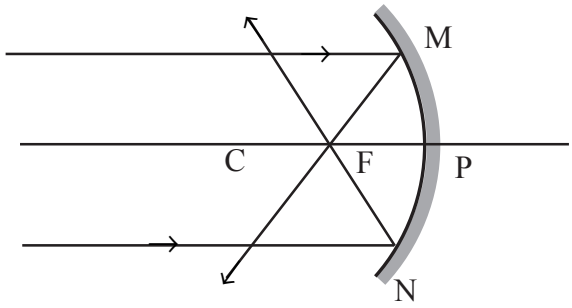


$\angle$AOY= Angle of incidence (i), $\angle$YOB= Angle of reflection (r)

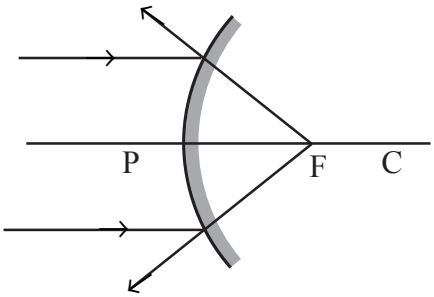
- **Image:** When light rays coming from a point source after reflection or refraction meet at a point or appear to be coming from a point, the second point is called the image of the first point.
- **Images are of two types:**
  (i) Real image and (ii) Virtual image.
- The image formed by a plane mirror is virtual, erect and of the same size as that of the object. The image is laterally inverted.

Spherical Mirror:

- If the reflecting surface of a mirror is a part of a follow sphere then, it is called a spherical mirror. Spherical mirrors are of two types:-
  (i) Concave mirror and (ii) Convex mirror.
- **Concave mirror:** When the reflecting surface of a spherical mirror is curved inward, that is faced towards the centre then; it is called a concave mirror.



- **Convex mirror:** When the reflecting surface of a spherical mirror is curved outward then; it is called a convex mirror.



Some definitions related to spherical mirror-

- **Pole:** The midpoint of the reflecting surface of the spherical mirror is called its pole.
- **Centre of curvature:** The centre of that sphere of which the spherical mirror is a part is called the centre of curvature.
- **Radius of curvature:** The radius of that sphere of which the spherical mirror is a part is called the radius of curvature.
- **Principal axis:** The straight line joining the pole and the centre of curvature of the spherical mirror is called its principal axis.
- **Aperture:** The diameter of the circular periphery of the spherical mirror is called its aperture.
- **Principal focus:** If the light rays parallel to the principal axis incident on a spherical mirror, after reflection from the mirror meet at a point or appear to diverge from a point on the principal axis then that point is called the principal focus of that spherical mirror.
- **Focal length:** The distance of the focus from the pole of the spherical mirror is called its focal length.

- A concave mirror forms a real image when the object is placed at a distance greater than its focal length and forms virtual image when the object is placed at a distance less than its focal length.
- A convex mirror always forms a virtual and diminished image.
- For a paraxial ray,
  Radius of curvature = 2 × Focal length
  That is, r = 2f
- General spherical mirror formula:

$$\frac{1}{\text{Image distance (u)}} + \frac{1}{\text{Object distance(v)}} = \frac{1}{\text{Focal length (f)}}$$

- **Magnification:** In case of a spherical mirror, magnification is the ratio of image height to the object height.

  If height of the object is PQ and height of the image is pq then,

$$\text{magnification (m)} = \frac{\text{height of the image (pq)}}{\text{height of the object (PQ)}}$$

  If object distance is u and image distance is v then,

$$\text{magnification (m)} = \frac{-\text{ image distance (v)}}{\text{object distance (u)}}$$

  Dentists use concave mirror while examining teeth. Concave mirrors are also used for saving.

  Driver of a car or a scooter use convex mirror as rear-view mirror.

  Refraction: The change in the direction of path of light ray as it enters obliquely from one transparent medium to another is called refraction of light.

- **Laws of refraction:**

  First law: Incident ray, refracted ray and the normal drawn to the surface of separation of the two media at the point of incidence always lie on the same plane.

  Second law: The ratio of the sine of the angle of incidence to the sine of the angle of refraction is always constant for two particular media and light of a particular colour.

- The refractive index of a transparent medium is the ratio of the speed of light in vacuum and the speed of light in that medium.
- In case of refraction from a rarer medium to a denser medium the deviation of light ray,
  δ = i-r, i = angle of incidence in the rarer medium and r = angle of refraction in the denser medium.
- In case of refraction from a denser medium to a rarer medium the deviation of light ray,
  δ = r - i, i = angle of incidence in the denser medium and r = angle of refraction in the rarer medium.

- When a light ray is refracted through a rectangular glass slab the emergent ray is parallel to the direction of the incident ray.

  Lens: A transparent medium bounded by two spherical surfaces or one spherical surface and one plane surface is called lens.

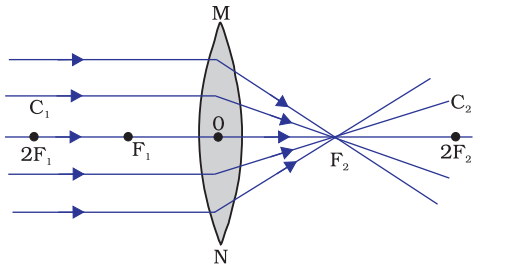
- Lenses can be classified mainly into two categories-

  (i) Convex lens: A lens which is thicker in the middle and thinner towards.

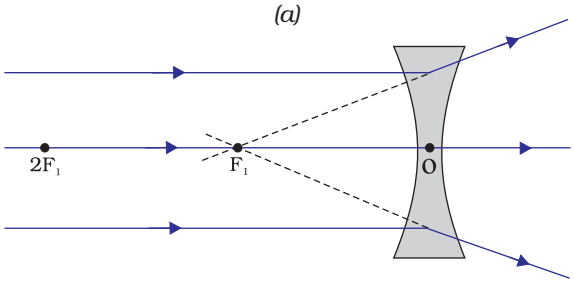
its edge is called a convex lens. These lenses converge the light rays and hence they are also called converging lens.

(ii) Concave lens: A lens which is thinner in the middle and thicker towards.

its edge is called a concave lens. These lenses diverge the light rays and hence they are also called diverging lens.



(a)



- **Lens formula:** If the object distance is u, the image distance is v and the focal length is f then,

  Lens formula is $1/v-1/u=1/f$

- **Magnification** (m) = $\frac{\text{height of the image}}{\text{height of the object}} = \frac{\text{image distance (v)}}{\text{object distance (u)}}$

- **Power of lens:** The ability of a lens to what extent it can converge or diverge a parallel beam of light is called its power.

Power of lens (P) = $\frac{1}{\text{focal length of lens (f)}} = \frac{1}{f}$

- In SI, the unit of the power of lens is dioptre (D).
- The power of a convex lens is positive and the power of a concave lens is negative.

A. Select the most appropriate option from those given below each question
(Each question carries 1 mark) :

1. The image formed by a plane mirror is
   (a) always real (b) always virtual
   (c) either real or virtual (d) none of these.

Ans:

2. When the object is placed at the focus of a concave mirror, the image is formed-
   (a) at infinity (b) beyond the centre of curvature
   (c) at the centre of curvature (d) at the focus.

Ans:

3. Which of the following mirror always forms a virtual image?
   (a) concave mirror (b) convex mirror
   (c) both concave and convex mirrors (d) none of these.

Ans:

4. The midpoint of the reflecting surface of a spherical mirror is called-
   (a) focus (b) pole
   (c) principal axis (d) aperture.

Ans:

5. In case of a plane mirror, if the angle of incidence is 40° then, the angle of reflection is-
   (a) 50° (b) 90°
   (c) 40° (d) 0°.

Ans:

6. When the object is placed at the centre of curvature of a concave mirror, the size of the image formed is
   (a) diminished (b) of same size as that of the object
   (c) magnified (d) none of these.

Ans:

7. If the radius of curvature of a spherical mirror is R and its focal length is f then,
   (a) R = f (b) R =2f
   (c) R =f/2 (d) R =3f
   Ans.

8. A diverging mirror is a-
   (a) plane mirror (b) convex mirror
   (c) concave mirror (d) none of these.

Ans:

9. The absolute refractive index of water is-
(a) 1.33 (b) 1.5
(c) 2.42 (d) 1.36

Ans:

10. If the refractive index of water with respect to air is 4/3, the refractive index of air with respect to water is
(a) 1.75 (b) 0.75
(c) 0.5 (d) 0.25
Ans:

11. Linear magnification of the image formed by a convex lens is -
(a) less than 1 (b) greater than 1
(c) equal to 1 (d) all of these.

Ans:

12. The position of the optical centre of a lens is-
(a) outside the lens (b) inside the lens
(c) at the centre of curvature (d) on the focal plane of the lens.

Ans:

13. If the object is at a distance f from a convex lens then, the image is formed-
(a) at infinity (b) at the focus
(c) in between the optical centre (d) none of these.
And the focus

Ans:

14. When the object is at infinity then, the image formed by a concave lens is-
(a) highly magnified (b) highly diminished (point like)
(c) of same size as that of the object(d) none of these.

Ans:

15. Power of a spherical lens is – 0.25 D. The focal length of the lens is-
(a) – 4 cm (b) – 400 mm
(c) – 4 m (d) – 40 m.

Ans:

16. Power of a convex lens is –
(a) negative (b) positive
(c) both positive and negative (d) none of these

Ans:

B. In the followings fill in the blanks with appropriate word :
(Each question carries 1 mark)

1. The size of the image formed by a plane mirror is _____ equal to the size of the object.
2. The image formed by a convex lens is _____ and _____.
3. Lens is a transparent _____ medium.

4. ${}_{a}n^{b} \times {}_{b}n^{a} =$ _____
5. The refractive index of diamond is _____.
6. Power of a lens and its focal length are the _____ to each other.
7. The second law of refraction is called _____ law.
8. A lens has _____ foci.
9. The focal length of a convex lens is always _____.
10. _____ lens is used as magnifying glass.

C. Mention whether the following statements are true or false:
(Each question carries 1 mark)

1. A concave lens does not behave as a magnifying glass.
Ans:
2. A real image is always formed by a concave mirror.
Ans:
3. The speed of light in vacuum is 4×10^{8} m s^{-1}.
Ans:
4. The optical centre of a lens is a fixed point.
Ans:
5. The focal length of a glass plate is infinite.
Ans:
6. An inverted image is always formed by a convex mirror.
Ans:
7. Power of a lens is the reciprocal of its focal length.
Ans:
8. When an object is placed at the focus of a concave lens, the image is formed at the focus.
Ans:
9. Power of a concave lens is negative.
Ans:
10. SI unit of the power of a lens is dioptre (D).

D. Assertion-reasoning (Each question carries 1 mark):

To choose the correct answer, read the statement and reason of the followings carefully and find out from (a), (b), (c) and (d); which one is most appropriate.
(a) Statement is correct, reason is also correct. Reason is the correct explanation of the statement.
(b) Statement is correct, reason is also correct. Reason is not the correct explanation of the statement.
(c) Statement is correct, reason is wrong.
(d) Statement is wrong, reason is correct.

I. Statement: Car driver uses convex mirror in car.
II. Reason: A convex mirror has a very large field of view.
Ans:
I. Statement: The image formed by a plane mirror can be casted on a screen.
II. Reason: The image formed by a plane mirror is virtual image.
Ans:
I. Statement: When looked at the curved and outward bulged part of a big shining spoon, a diminished and erect image is seen.
II. Reason: In this case, the spoon behaves like a concave mirror.
Ans:
I. Statement: Inside water an air bubble behaves like a concave lens.
II. Reason: The focal length of a glass plate is infinite.
Ans:
I. Statement: When light is reflected from glass to air, light rays move away from the normal.
II. Reason: When light is reflected from a denser medium to a rarer medium, light rays move away from the normal.
Ans:
I. Statement: The converging or diverging power of a lens depends on its focal length. The power of lens of converge or diverge light rays depends on its focal length.
II. Reason: Lens of a smaller focal length has more power.
Ans:

E. Answer the followings in a word or one sentence:
(Each question carries 1 mark)

1. What is the speed of light in free space?
Ans:
2. Can light travel in free space?
Ans:
3. What is the refractive index of glass?
Ans:
4. What is the power of a plane mirror?
Ans:
5. What is the focal length of a plane mirror?
Ans:
6. Which type of image is formed by a plane mirror?
Ans:
7. Which type of mirror is used to obtain parallel rays from a point object?
Ans:
8. Which type of lens has positive power?
Ans:

9. Which type of image cannot be casted on a screen?
Ans:
10. What is the power of a lens of focal length 1 m?
Ans:
11. Which type of mirror is used in solar cooker?
Ans:
12. What is the relation between angle of incidence and angle of reflection?
Ans:

F. Answer the followings inbrief (Each question carries 2 marks):

1. Write the two laws of reflection.
2. What do you mean by the focus of a spherical mirror?
3. What do you mean by magnification by a spherical mirror?
4. Write two uses of concave mirror.
5. Write two uses of convex mirror.
6. Why convex mirror is used as view- finder in car?
7. Why dentists use concave mirror while examining teeth of patients?
8. What is called converging lens? Show by a diagram.
9. What do you mean by principal axis of a lens?
10. What is the power of a lens? Give its SI unit.

G. Answer the following questions (Each question carries 3 marks):

1. What is called reflection of light? Write the two laws of reflection.
2. The radius of curvature of a spherical mirror is 30 cm. What is its focal length? What do you mean by the pole of a spherical mirror?
3. When an object is kept at a distance 2f that is, at the centre of curvature of the lens then, what will be the position, size and nature of the image formed?
4. Why is a glass rod not visible when it is immersed in glycerin? Whether the power of a convex lens is positive or negative?
5. Half of a convex lens is covered with black paper. Will a complete image of an object be formed by this lens?
6. State Snell's law. What is the refractive index of water?
7. What is lens formula? Determine the power of lens of focal length 2 m.
8. What are called relative refractive index and absolute refractive index?
9. What do you mean by aperture of a lens? Why a lens has two foci?
10. Write the differences between real and virtual images. What is the linear magnification of an image formed by a convex mirror?

H. Comprehensive type questions (Each question carries 3 marks):

1. Two sisters Rita and Nita were discussing about different types of mirror with their father. By the by bringing a shiny spoon from the kitchen their father gave them and asked them to view their face in the bulge and inward curved portion of the spoon. Then and then taking the spoon two sisters viewed and easily grasp the concept about spherical mirror.

i) The curved and bulged outward surface of the spoon behaves like which type of mirror?

ii) The surface of the spoon curved inward behaves like which type of mirror?

iii) Which type of image is formed by a plane mirror?

2. Rahul and his three friends have started for Dharmanagar from Udaipur in a car. While driving Rahul suddenly saw in the mirror attached with his car that a car meet with an accident. He and his friends ran to the spot and get into rescuing the driver and the passengers of that car involved in accident and made arrangement so that they get admitted them to the nearby hospital and then started for Dharmanagar.

i) Which type of mirror is used next to the driver in the vehicles?

ii) Image of which size is formed by such type of mirror?

iii) Why such mirrors are used in vehicles?

3. Two friends were performing different experiments with convex and concave lenses. They were trying to cast the image of sun on a piece of paper by two lenses without looking directly at the sun. At a certain time, they found that smoke was coming out of the paper, kept under the lens which was in the hand of one of them. Two friends were cheerfully observing it.

i) What are the names of lenses used by two friends?

ii) For which lens smoke is produced in the paper?

iii) Which type of image of the sun is formed on the paper?

I. Long Answer type questions (Each question carries 3 marks):

1. Distinguish between concave and convex mirrors. What is called the radius of curvature of a concave mirror and show with a diagram?
2. How can we recognize a convex, a concave and a plane mirror without touching them? Write two uses of concave mirror.
3. Why is a glass rod not visible when it is immersed in glycerin? What is the magnification of a lens?

J. Numerical questions (Each question carries 2 marks):

1. An object is at a distance 20 cm from a convex lens and if the image is formed at a distance 10 cm from the lens then, what is the linear magnification of the image?
2. What is the power of a convex lens of focal length 4 m?
3. What will be the focal length of a concave mirror if its radius of curvature is 20 cm?
4. Power of a lens is -2 D. Which type of lens is this? What is its focal length?

K. Numerical questions (Each question carries 3 marks):

1. A concave lens of focal length 15 cm forms an image of an object at a distance 10 cm from the lens. What is the object distance?
2. A three times magnified image of an object placed at a distance 10 cm from a concave mirror is formed. What will be the image distance?
3. An object is kept at a distance 10 cm from a convex lens of focal length 15 cm. What will be the nature and position of the image?
4. A student uses two lenses of focal lengths 50 cm and -50 cm. What are the nature and powers of the lenses?
5. At what distance from a convex lens of focal length 18 cm an object is to be placed to obtain an image at a distance 36 cm from the lens?

*****

Chapter 11

Human Eye and the Colourful World

Chapter at a glance:

- Eye is a sensitive sense organ which enables us to see the beautiful and colourful world around us.

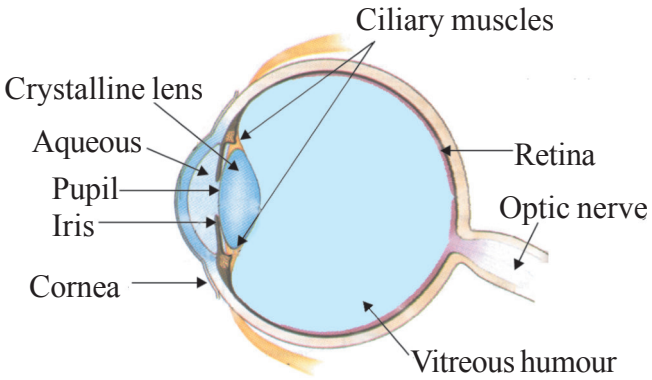


Fig- Human eye

- Different parts of an eye-
- **Cornea:** It is a thin membrane covering the front surface of the eyeball through which light enters the eye.
- **Iris:** It is a dark muscular thin diaphragm that controls the size of the pupil.
- **Pupil:** It acts like a hole of varying size, whose size is controlled by the iris.
- **Lens:** It is composed of a transparent and flexible material.
- **Retina:** It is a light sensitive screen on which an image is formed by the lens.
- **Optic nerve:** They send the signals generated in the retina to the brain.

- **Functions of eye**
- Light coming from the object enters the eyeball through the cornea.
- Light adapted by the iris travels through the lens and form an inverted, real image on the retina.
- The electrical signals generated in the retina reach the brain and produce visual sensation.
- **Near point:** The minimum distance from an eye at which if an object is placed, it can be seen comfortably and distinctly is called the near point. For a healthy eye this distance is about 25 cm.
- **Far point:** The farthest point from an eye up to which an object can be seen distinctly is called the far point. For a normal eye far point is at infinity.
- **Power of Accommodation:** The ability of the eye lens to adjust its own focal length is called accommodation.
- **Defects of eye**
- **Myopia:** The defect of the eye due to which one can see the near object but not the distant object distinctly is called myopia.

  Causes of this defect are- (i) excessive curvature of the eye lens and,
  (ii) elongation of the eyeball.

  This defect can be corrected by using a concave lens of suitable power.
- **Hypermetropia:** The defect of the eye due to which one can see the distant object but not the near object distinctly is called hypermetropia.

  Causes of this defect are- (i) the focal length of the eye lens has become too long and,
  (ii) the eyeball has become too small.

  This defect can be corrected by using a convex lens of suitable power.
- **Presbyopia:** The power of accommodation decreases with ageing. The near point gradually recedes away. As a result, it becomes difficult to see nearby objects distinctly. This defect is called presbyopia.

  This defect can be corrected by using convex lens of suitable focal length.

Refraction of light through a prism:

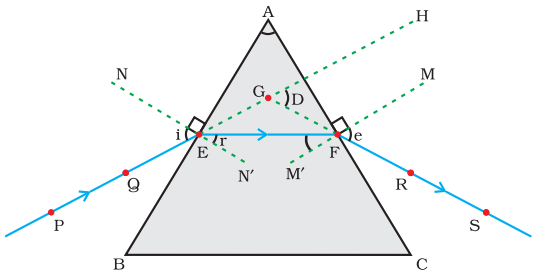


Fig-Refraction of light through a triangular glass prism

PE - Incident ray	$\angle$ i - Angle of incidence
EF - Refracted ray	$\angle$ r - Angle of refraction
FS - Emergent ray	$\angle$ e - Angle of emergence
$\angle$ A - Angle of the prism	$\angle$ D - Angle of deviation

- **Angle of deviation:** Due to the peculiar shape of the prism the emergent ray from the prism bend at an angle to the direction of the incident ray. This angle is called the angle of deviation.
- **Dispersion of Light:** The phenomenon of splitting of white light into different colours by a prism is called dispersion of light. The sequence of different colours is violet, indigo, blue, green, yellow, orange and red (VIBGYOR).
- **Spectrum:** The coloured band of light produced by the different colours of a light beam is called its spectrum.
- **Rainbow:** This is a natural spectrum. It is produced due to the dispersion of sun light by the tiny water droplets present in the atmosphere.
- **Twinkling of stars:** The light rays coming from stars bend in the atmosphere. As a result the star appears slightly higher than its actual position. Due to the change of the atmosphere the apparent position of the star also changes and thus the light coming from the star is twinkling.
- **Scattering of light:** Sunlight while passing through the atmosphere get reflected diffusely by the air molecules and dust particles suspended in air and thereafter reaches our eyes. This phenomenon is called scattering of light.
- **Tyndall effect:** When light is passed through a colloidal solution light get scattered by the colloidal particle of the solution and the path of light becomes visible. This phenomenon is called tyndall effect.
- **Blue colour of the sky:** Sunlight while passing through the atmosphere the blue colour light is scattered more strongly than red colour light by the tiny air particles. This scattered blue light enters our eyes. That's why clear sky looks blue.
- **Redness of the Rising and Setting Sun:** At the time of sunrise and sunset, when the position of the sun is near the horizon most of the blue colour and light of shorter wavelength get scattered by the air particles. Therefore light of longer wavelengths reaches our eyes. And thus sun appears reddish.

A. Select the most appropriate option from those given below each question (Each question carries 1 mark) :

1. The ability of the human eye for which it can focus on the objects positioned at different distances by adjusting the focal length of the eye lens is-
   (a) presbyopia (b) accommodation
   (c) near-sightedness (d) short-sightedness.

Ans:

2. Where the human eye forms an image of an object?
   (a) cornea (b) iris
   (c) pupil (d) retina.

Ans:

3. The least distance of distinct vision for a person with normal vision is-
   (a) 2.5 m (b) 2.5 cm
   (c) 25 cm (d) 25 m.

Ans:

4. Which of the following adjusts the size of the pupil?
   (a) cornea (b) ciliary muscles
   (c) optic nerve (d) iris.

Ans:

5. A woman cannot see the distant objects but, can see the nearer objects distinctly. That very woman is suffering from which defect of vision?
   (a) hypermetropia or long-sightedness (b) myopia
   (c) presbyopia (d) none of these.

Ans:

6. To read a book a person have to keep the book at arm's length. What could be the defect of vision the person is suffering from?
   (a) hypermetropia (b) myopia
   (c) presbyopia (d) none of these.

Ans:

7. Due to functioning of which of the followings, the focal length of the eye lens changes?
   (a) pupil (b) retina
   (c) ciliary muscles (d) iris

Ans.

8. The range of vision for a healthy eye is-

(a) 0 - 25 cm (b) 25 cm - 50 cm

(c) 50 m - 100 m (d) 25 cm - infinity.

Ans:

9. A person with long-sightedness uses-

(a) convex lens (b) concave lens

(c) cylindrical lens (d) none of these.

Ans:

10. A person with short-sightedness uses-

(a) convex lens (b) concave lens

(c) cylindrical lens (d) none of these.

Ans:

11. The cause behind the formation of rainbow is -

(a) reflection (b) dispersion

(c) refraction (d) all of the above.

Ans:

12. If there is no atmosphere, the sky would have appeared

(a) blue (b) violet

(c) white (d) black.

Ans:

13. Which colour light is always used as danger signal?

(a) green (b) red

(c) yellow (d) violet.

Ans:

14. Which of the following media is not dispersive?

(a) water (b) glass

(c) air (d) glycerin.

Ans:

15. Due to which of the following phenomenon the stars twinkle?

(a) reflection of light (b) dispersion of light

(c) refraction of light (d) none of these.

Ans:

16. Which of the following colours has the least deviation among the colours produced when a white light falls on the refracting surface of a prism?

(a) violet (b) red

(c) green (d) blue.

Ans:

17. The cause behind the red colour of the sun at sunrise-

(b) red colour scattered maximum (b) blue colour scattered maximum

(c) blue colour scattered minimum (d) none of these.

Ans:

18. The phenomenon of splitting of white light into seven colours while passing through a prism is called-

(c) refraction (b) reflection

(c) dispersion (d) scattering.

Ans:

19. Through which of the followings does the electric signal reach the brain from retina?

(d) ciliary muscles (b) optic nerve

(c) iris (d) cornea.

Ans:

20. The nature of the eye lens is-

(e) convex (b) concave

(c) plane (d) none of these.

Ans:

B. In the followings fill in the blanks with appropriate word:
(Each question carries 1 mark)

1. Iris is a muscular membrane which controls the size of the _____.
2. The eye lens forms a _____ image of object at the retina.
3. The ability of eye lens to adjust its focal length is called _____.
4. Sometimes the eye lens of aged persons become milky white and cloudy. This condition of an eye is called _____.
5. Human being have two eyes, _____ picture of the surrounding objects become clear.
6. A person with _____ can see the nearby objects clearly but cannot see the distant objects distinctly.

7. Long sightedness can be corrected by using a _____ lens of appropriate power.
8. Splitting of light into its component colours is called_____.
9. The formation of band of different colours by splitting white light while passing through a prism is called _____.
10. Rainbow is formed due to the dispersion of light by the tiny _____ suspended in atmosphere.
11. Stars twinkle due to _____ of light in the atmosphere.
12. The phenomenon of scattering of light by the colloidal particle is called _____.
13. The minimum distance from an eye at which if an object is placed, it can be seen comfortably and distinctly is called the _____ of the eye.
14. Presbyopia is generally the _____ defect of vision of eyes.
15. The angle between the two refracting surfaces of a prism is called _____.

C. Mention whether the following statements are true or false:
(Each question carries 1 mark)

1. The wavelength of blue colour is maximum.

Ans:

2. When the eye ball becomes larger, it causes short-sightedness.

Ans:

3. Ciliary muscles control the size of the pupil.

Ans:

4. An erect real image of an object is formed on the retina.

Ans:

5. When the eye ball becomes smaller, it causes long-sightedness.

Ans:

6. The range of vision of a normal eye ranges from 25 cm to 100 cm.

Ans:

7. Rainbow is formed in the same side of the sky in which the sun is.

Ans:

8. The path of light through a colloidal solution becomes visible.

Ans:

9. The sky looks blue due to the refraction of blue colour light in the atmosphere.

Ans:

10. The sun looks reddish at the sunset.

Ans:

D. Assertion-reasoning (Each question carries 1 mark) :

To choose the correct answer, read the statement and reason of the followings carefully and find out from (a), (b), (c) and (d); which one is most appropriate.

(a) Statement is correct, reason is also correct. Reason is the correct explanation of the statement.

(b) Statement is correct, reason is also correct. Reason is not the correct explanation of the statement.

(c) Statement is correct, reason is wrong.

(d) Statement is wrong, reason is correct.

1. I. Statement: Human eye can see nearby and distant objects distinctly.
   II. Reason: With the help of the power of accommodation, eye forms images of distant and nearby objects on the retina.

Ans:

2. I. Statement: Person with short-sightedness cannot see the distant objects clearly.
   II. Reason: With the increase in age, power of accommodation of eyes decreases.

Ans:

3. I. Statement: Seven colours are found in a rainbow.
   II. Reason: Due to the dispersion of light by the water droplets light splits into seven colours.

Ans:

4. I. Statement: Planets twinkle.
   II. Reason: Planets are nearer to the earth.

Ans:

5. I. Statement: The sun looks reddish at the sunset.
   II. Reason: Travelling a long distance through the earth's atmosphere red colour light of longer wave length present in sunlight reaches our eyes.

Ans:

E. Comprehensive type questions (Each question carries 3 marks)

1. Four friends together went to a picnic. The weather was very fine. They were playing various games. Suddenly one of them, Subrata said to others, 'Wow! What a beautiful rainbow.' Another one of them, Shyamal asked others, 'What is a rainbow?' Then Subrata explained how a rainbow is formed. All thanked him for it.

(a) How many colours of a rainbow Subrata has spoken about?

(b) If Shyamal stands facing the rainbow, then what will be the position of the sun?

(c) With the help of which apparatus we can observe such phenomenon?

2. Two friends, Dipa and Sima are reading in same class and Sima has been suffering from an eye problem for few days. Sitting on the last bench, she cannot read the letters written on the blackboard.For last few days Dipa is observing that Sima does not like to sit on the last bench. When Dipa asked Sima, she said about her problem. Dipa said her to consult with a doctor. Examining her, the doctor have suggested her to use a spectacle.

(a) What is the eye problem that Sima was suffering from?

(b) What are the reasons of such problem?

(c) Which type of spectacle is suggested by the doctor to use?

3. Somnath and Prasanta are reading in class nine. Being a holiday, on Sunday at noon they have started for playing cricket in the playground. Suddenly, when they were playing, Prasanta observed that sun looks red and it is so beautiful. Then Prasanta showed it to Somnath and said, "Look, why the colour of sun has been changed" Somnath explained its reason. Hearing all, Prasanta became happy.

(a) At what position of the sun, Prasanta saw the red colour of the sun?

(b) At what other position of the sun, the red colour is seen?

(c) What is the reason of seeing the reddish sun?

F. Answer the followings in brief (Each question carries 2 marks):

1. Write the name of a natural optical instrument.
2. What is the nature of the eye lens?
3. On which part of the eye does the image form?
4. Which changes the focal length of the eye lens?
5. What is the minimum distance of distinct vision of eyes?
6. Does the dispersion of light take place in free space?
7. Which defect occur if the size of the eyeball decreases?
8. With how many colours does the white light comprise of?
9. Is a prism able to produce colours?
10. How does an astronaut see the sky?
11. What is called tyndall effect?
12. Write one function of cornea.
13. What type of spectacle is used by a person with short-sightedness defect of eyes?
14. Which component of white light get scattered minimum by the dust particles?
15. Write the names of two phenomena which take place due to atmospheric refraction?

G. Answer the following questions (Each question carries 3 marks):

1. Spectrum is formed when a prism is placed on the path of a beam of white light. Now if a similar prism is placed side by side inverted with respect to the first one then show with a ray diagram what will happen?
2. Stars look some times brighter and sometimes fainter. What is the name of this effect? Explain the reason behind it?
3. What is the colour of the clear sky during daytime? Explain the reason behind it.
4. Why do stars twinkle but not the planets?
5. Show with a ray diagram how does the refraction of a ray take place through a prism and also show incident ray, emergent ray and angle of deviation on it.
6. What is short-sightedness? Show with the help of a ray diagram how it can be corrected?
7. What is long-sightedness? Show with the help of a ray diagram how it can be corrected?
8. The sun looks red at the sunrise and sunset but white at noon. Why?

H. Long Answer type questions (Each question carries 5 marks):

1. (a) Draw a diagram of the human eye and label its different parts.
   (b) What do you mean by the power of accommodation of eye?
2. (a) Mention the different defects of human eye.
   (b) Briefly write the remedial measures of these defects.
3. (a) What do you mean by the atmospheric refraction? Mention one phenomenon related with it.
4. (b) What do you mean by scattering of light? Mention one phenomenon related with it.

Chapter-12

ELECTRICITY

Chapter at a glance

In modern civilization, one of the contribution of science is electricity and its uses. It is a controllable and convenient form of energy. It has a wide variety of uses in homes, communication and industries. It makes our daily life faster and easier.

Electric charge and current : Electric charge is such a physical quantity which is defined by the surplus or deficiency of electrons in the object. It is the intrinsic property of fundamental particles of atom.

Current is the amount of charge flowing through a specific area per unit time.

1. Conventionally, the direction of electric current is taken in the direction opposite to the direction of the flow of electron. SI unit of electric charge is coulomb (C) and SI unit of current is ampere (A).

   We use electric cell or battery to maintain the flow of electron in the electrical circuit. In an electric circuit an electric cell produces potential difference accross its two ends. The potential difference is measured in volt (V) unit.

2. The property of a conductor by virtue of which it opposes the flow of electrons through it is called the resistance of the conductor. It controls the magnitude of eletric current. SI unit of resistance is ohm (Ω).

3. **Ohm's Law :** The current flowing in a conductor is directly proportional to the potential differance accross its ends provided that the physical conditions and the temperature of the conductor remain constant.

   $V \propto I$ (Keeping all physical conditions constant)

   $V = IR$ or $I = V/R$

   R = Resistance of the conductor.

The resistance of a conductor is directly proportional to its length, inversely proportional to its cross-sectional area and depends on the material of the conductor.

$R \propto l$

$R \propto l/A$

$R = \rho\, l/A$

l = electrical resistivity of the material of the conductor.

4. The equivalent resistance R_s of some resistances (R_1, R_2, R_3 ...) connected in series is equal to the sum of all these resistances. $R_s = R_1 + R_2 + R_3 + ...$

5. The reciprocal of equivalent resistance R_p of some resistors (R_1, R_2, R_3 ....) connected in parallal is equal to the sum of the reciprocal of individual resistances.

$1/R_p = 1/R_1 + 1/R_2 + 1/R_3 + ...)$

The electric energy dissipated in a resistor is given by, $W = V \times I \times t$

V = Potential difference accross the resistance

I = Electric current

t = time.

6. For a steady current I, the amount of heat produced in time t is $H = VIt = I^2Rt$.
This is known as Joule's law of heating.

7. The unit of power is watt (W). One watt of power is consumed when 1 A of current flows at a potential difference of 1V.

8. The commercial unit of electrical energy is kilowatt - hour (kW-h)

1 kW-h = 3600000J = 3.6×10^6 J.

1 kW-h = 1 BOT. BOT = Board of Trade unit.

Fuse wire - it protects electric circuits and appliances by stopping the flow of any unduly high electric current.

A. Multiple Choice type questions

1. What is measured by an ammeter?

a) Resistance of the conductor. b) Electric current.

c) Potential difference. d) Electric energy.

Ans :

2. In a conductor the electric current is conducted by

a) free electrons b) atoms c) nucleus d) ions.

Ans :

3. What is the potential of earth?

a) 1 b) 0, c) Infinite d) None of the above.

Ans :

4. The resistance of an ideal ammeter is

a) zero b) infinite c) 1 d) none of the above.

Ans.

5. Voltmeter is connected with the electric circuit in

a) parallal combination b) series combination c) 45^0 angle d) do not connect.

Ans.

6. The charge of an electron is

a) 16×10^{-19} C b) 1.6×10^{19} C c) -1.6×10^{19} C d) 3.2×10^{-19} C

Ans.

7. The cross-sectional area of a conductor is reduced keeping its length unchanged. The resistance of this conductor -

a) decreases b) increases c) remains same d) none of the above.

Ans :

8. The equivalent resistance of two resistances $2\,\Omega$ and $8\,\Omega$ connected in parallal is -

a) $10\,\Omega$ b) $1.6\,\Omega$ c) $16\,\Omega$ d) $5\,\Omega$

Ans

9. If R is the equivalent resistance of three resistances R_1, R_2, R_3 ($R_1 > R_2 > R_3$) connected in parallal then.

a) $R > R_1$ b) $R > R_2$ c) $R > R_3$ d) $R < R_3 < R_2 < R_1$

Ans.

10. The electric potential at a point is 20 V. The work done in bringing a charge 0.5 C from infinity to that point is

a) 20 J b) 10 J c) 5 J d) 40 J

Ans

11. Which of the following units can be expressed as joule/coulomb-

a) watt b) volt c) ampere d) ohm.

Ans.

12. The quantity which remains same for all resistances connected in series is -

a) potential difference b) electric current

c) consumed energy d) none of the above.

Ans .

13. Fuse wire is made of which material?

a) tin b) lead c) alloy of tin and lead d) alloy of copper and aluminum.

Ans.

14. If same current is sent through a conductor for twice the period of time, then heat generated will be

a) same b) doubled c) four times d) eight times.

Ans

15. If the resistance of a conductor (R) and time (t) is kept constant, the relation between heat (H) produced and electric current (I) is -

a) $H \propto 1/I$ b) $H \propto I^2$ c) $H \propto I$ d) $H \propto \sqrt{I}$

Ans

16. The resistance of an open circut is

a) infinite b) zero c) $10\,\Omega$ d) $100\,\Omega$

Ans.

17. The ratio of equivalent resistance of 'n' numbers of resistances (R) connected in series and parallel is

a) n:1 b) n^2:1 c) 1:n d) $1:n^2$

Ans.

18. Which of the following bulb has maximum resistance?

a) 220V-30W b) 220V-40W c) 220V-60W d) 220V-100W

Ans.

19. Which physical quantity's unit is BOT?

a) Consumed electrical energy

b) Flowing charge

c) Potential difference

d) Resistance.

Ans.

20. The power of an electrical circuit is not expressed by which of the following queantities ?

a) I^2R b)IR^2 c) VI d) V^2/R

Ans.

21. 1 watt hour = how many joules ?

a) 360 J b) 3600 J c) 3060 J d) 3006 J

Ans.

22. 1 joule/coulomb =

a) 1 watt b) 1ohm c) 1 volt d) 1 ampere.

Ans.

B. Fill in the blanks (1 marks each)

1. SI unit of electric charge is _____.

2. Conventionally, the direction of electric current is taken to the opposite direction of flow of _____.

3. The composite material of the heating coil used in electric heater is _____.

4. The electromotive force is measured with the help of _____ instrument.

5. The number of electrons in 1 coulomb of charge is _____.

6. The full name of BOT is _____

7. The resistance of human body in wet condition is _____ ohm.

8. SI unit of electric potential is _____.

9. The resistance of a rubber band is _____ than the resistance of a copper piece of same size.

10. The material used in the filament of electric bulb is _____.

11. The fuse wire usually has _____ melting point.

12. When 5A current is passed for 2 mins through an electrical instrument, then total _____coulomb of charge will flow.

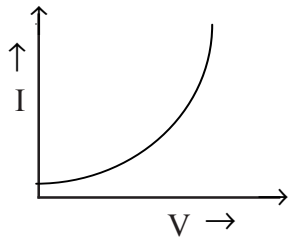
13. The equivalent resistance of two resistances R_1 and R_2 connected in parallel is _____.

14. The speed at which free electron moves in a metal conductor is known as _____.

15. The maximum resistance that is obtained by using 5 resistors of 15 Ω each is _____?

C. True False type questions (1 mark each)

1. The V-I graph for an ohmic conductor can be expressed like this --

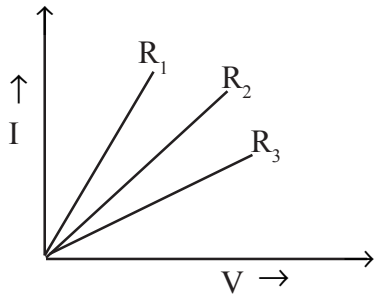


2. The force exerted on electric cell is electromotive force.

3. The conductivity of a conductor = 1/ (Resistance)^2

4. SI unit of resistivity is ohm-meter.

5. One student draw the V-I graph (shown in the figure) after experimenting with 3 pieces of nicrome wire having resistances R_1, R_2, R_3.



From the graph we can conclude that $R_2 < R_1 < R_3$

6. The practical unit of electrical power is joule.

7. The relationship between the potential difference between the two ends of a conductor and the electric current flowing through it is expressed by a formula by the scientist Kelvin.

8. Aluminium has higher electrical conductivity than iron.

9. 1 volt = 300 esu voltage.

10. We get maximum equivalent resistance of the resistors connected in series.

Assertion, reasoning type questions (1 mark)

(a) Assertion & reason both are correct and reason is the correct explanation of assertion.

(b) Assertion & reason both are correct and reason is not correct explanation for assertion.

(c) Assertion is correct but reason is not correct.

(d) Assertion is not correct but reason is correct.

(e)Assertion & reason both are wrong.

1. Assertion :- There will not be flow of charge between two charged body connected with a wire if both have equal charges.
   Reason - Electric current is the rate of flow of charge.
2. Assertion :- Fuse wire is of high resistance and lower melting point.
   Reason :- The fuse wire is used to protect the circuit.
3. Assertion :- Alloys are used to make heat generating parts for electrical appliances (such as electric engines, heaters etc)
   Reason :- Alloys are not oxidized at high temperature.
4. Assertion :- Household electrical appliances such as electric bulb, fan, refrigerator etc are connected in series.

Reason :- Equivalent resistance in series is less.

5. Assertion :- The connecting wire in the circuit is made of copper.
   Reason :- Copper has high electrical conductivity.
6. Assertion :- If length is doubled, the resistance of the conductor is halved.
   Reason :- Resistance (conductor's) is inversely proportional to its length.

Read the passage and answer the following question :-

1. When Raju and Sumit came to the playground in the afternoon, they saw the hawker like everyday. He was leaning on an electric pole and selling things. They have been looking at the black-yellow bird sitting on the electric wire attached to the pole for so long. The bird flew away once and sitted on a branch of a nearby tree. After a which, it again came with two-three more birds and sat on the electric wire. Raju and his friends looking at it in surprise. Sumit said- 'What fun of the bird. If we caught that wire with empty hand, it would have been a great danger.' Raju said - but the man sitting leaning on the electric post is not in any danger.

a) What a danger to the people will occur if he holds an electric wire with bare hand?

b) Why is there no such danger in the case of birds?

c) Is it dangerous of touching electric poles? Explain.

2. Reena went to her friends house. Reena's friend Seema's mother brought bread, butter, toast and hot tea. She said that this toast has been prepared in the electric toaster which is bought today and tea has been prepared in electric heater. She then called science a blessing of human civilization and advised girls to study science with utmost care.

a) On what principle do electric toaster and heater work?

b) What is the coil used in this type of device made of? Write a feature of it.

3. As soon as Suman sat down to read in the evening, all the electric lights in the house went off and the electric fan was also turned off. He walked out of the house with annoy and saw that electric lights are shining in the neighbour's house. This time the matter became clear to him. He realized that the electric fuse in his house is damaged. He requested his father to install MCB.

a) What is fuse?

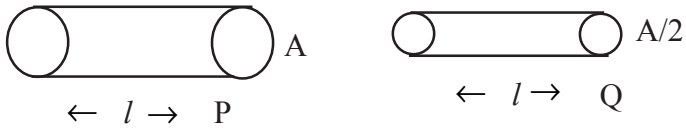
b) Of which material the fuse is made of ?

c) Currently a device called MCB is used to aviod the hassle of fuse replacement. What is the full form of MCB.

F. Short answer type questions :-

1. What is short circuit?
2. Why is the fuse used ?

3. What does 15A fuse wire mean?
4. On what factors does the conductivity of conductor depends?
5. What is a rheostat?
6. What is the resistance of an ideal voltmeter?
7. What is a regulator?
8. What is the value of mechanical equivalent of heat in c.g.s unit?
9. The resistivity of copper wire is 1.78 x 10^{-4} ohm m. What does it mean?
10. What will be the change in resistivity of a wire if its length is doubled?
11. How does the heat generated in a conductor depend on the direction of electric current?
12. Which of the following two wires P and Q have greater resistance? Why ?

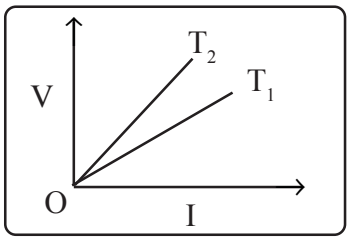


13. What is the reason of electrical conductivity?
14. What are the components metal of nicrome wire?
15. What is battery?

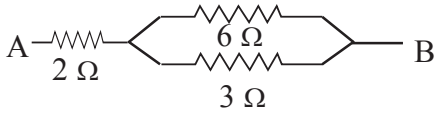
Answer the following questions :

1. What is electric current? Write SI unit of electric current. Which is the carrier of electricity in a metal conductor?
2. State and explain Ohm's law. Define resistance from Ohm's law.
3. A metal wire has abundant number of free electrons. However why there is no electric current in the wire untill a potential difference between the two ends of the wire is applied?
4. Though Joule's law of the heating effect of current is veritable, the Ohm's law is not entirely realistic - explain.
5. Why does the filament of an electric lamp radiate bright light but not the coil of the heater?
6. Why does the brightness of an electric lamp connected to the same line diminish a little at the moment of turning on a high powered electrical instrument?
7. When half of a currant carrying copper wire is dipped in cold water, the another half of the wire is heated more – why?

8. A metallic conductor is examined at the temperature T_1, and T_2 and drawn V-I graph. From the graph below, which temperature is higher and why?

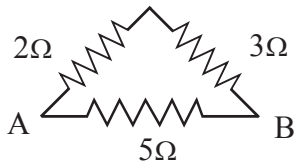


9. Mention any one of the factors other than tempereture on which the resistance of a conductor depends and how does it depend.
10. State the relation between potential difference, workdone and charge. How much work have to do to transfer a 5 C charge from one point at potential 210 V to another point at potential 240 V ?
11. If the ratio of flow of electric current through two copper wire of same resistance is 1:3, then what will be the ratio of heat generated by two wires at the same time?
12. What is the resistance between two points A and B?



13. A conductor is connected to a 20 V source. How much heat would be generated if 20 A current is flowing through the conductor for 5 minute?
14. The potential difference between the two ends of a conductor is 1 volt and 0.2 A current is flowing through it. What is the resistance of the wire?
15. The terminal potential difference of two conductors are equal. If the ratio of current flowing through the condutors is 1:2, then what is the ratio of the resistances of these two conductors?
16. The length of a copper wire is 4 meter. The cross-sectional area of the wire is 0.01 m^2. The resistivity of copper at 18^oC temperature is 1.78 x 10^{-6} ohm m, What is the resistance of the wire?
17. What is the magnitude of current flowing through a '220 V - 60 W' bulb?
18. The ratio of length , diameter and resistivity of material of two conducting wires is 1:2 each. If the resistance of the first wire is R then what is the resistance of the second wire?
19. What percentage of the equivalent resistanse of two resistances 6 Ω and 9 Ω connected in series is the equivalent resistance when they are connected in parallel?

20. Find the equivalent resistance between A and B.



20. How many resistors of value R (R whole number >1) can be connented in parallal to obtain a unit valued equivalent resistance?

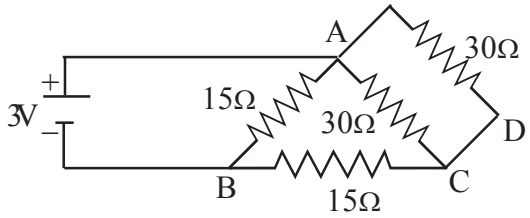
Descriptive type questions :

1. a. Which one of the 220V-100W and 220V-60W bulb will glow brighter and why?
   b. Write the differences between electromotive force and potential difference.
2. a) Show that the equivalent resistance of more than one resistances connected in parallel is less than the lowest valued resistance in the combination.
   b) Why is it essential to have very low resistance of an ammeter and very high resistance of a voltmeter?
3. a) What is Joule effect? Explain the cause of Joule effect.
   b) Mention two applications (in preatical case) of Joule effect.
4. a) Electricity is flowing through a metal wire. How will the amount of heat generated according to Joule's law change in the following cases.
   i) Current is three times, resistance and time constant.
   ii) Potential difference doubled, resistance and time constant.
   b) Why does electric heater work in both AC and DC?
5. a) How do we connect two resistors of 5 Ω and 10 Ω resistances with a 6V battery so that we get
   i) Minimum as well as maximum current.
   ii) Find the equivalent resistances in each case.
   iii) Determine the net flow in each case.
6. a) What is resistance of conductor? Write the SI unit of it. Name the factors on which resistance of a conductor depends. How does the resistance of a conducting wire changes if i) it's length is doubled, ii) radius is doubled?
7. a) A wire is divided into three equal pieces and then they are joined with the source in parallel.
   i) In this case, what will be the change in resistance and resistivity?
   ii) What will be the change in the flow of total current in the circuit and the amount of current flowing through the pieces?

8. a) 1A current is flowing when an electric bulb and a conductor of 5 Ω resistance are connected with a 10 V battery in series . Find the resistance of the bulb?

   b) If a 10 Ω resistor is connected in parallel with this series connection, then what will be the change in electric current flowing through the 5 Ω conductor and potential difference across the electric bulb? Give reason.

9. Determine the total current I in the following circuit.



10. a) Why are the heat generating coil of thermal electrical devices made of alloy metal instead of pure metal? Give two reasons.

b) A square is formed by adding 4 resistors of 4 Ω each in sequence . What will be the equivalent resistance between two adjacent vertices (or between two ends of any one resistor)?

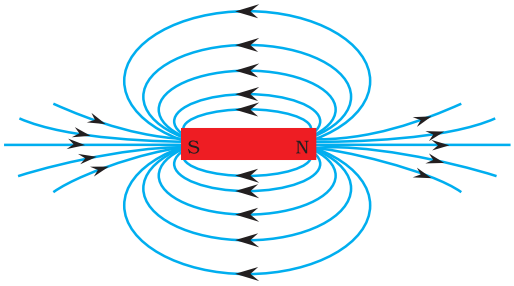
Chapter 13

Magnetic effect of electric current

Chapter at a glance

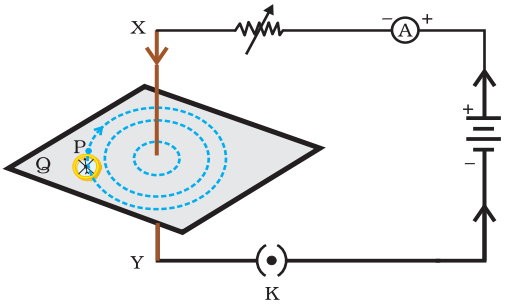
The substances that can attract iron. nickel etc and when suspended freely they always pointed towards north-south direction are called magnet.

* The substances that are attracted strongly by a magnet are called magnetic substances. These substances can be easily turned into magnet.
* A compass needle is a small magnet. Its one end which points towards north is called north seeking pole or north pole and the other end which points towards south is called south seeking pole or south pole.
* A magnetic field exists in the region surrounding a magnet. The magnetic effect of the megnet is felt in this region.
* A magnetic field can be represented by field lines.



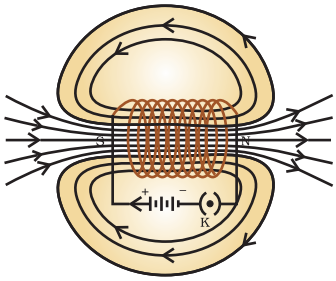
Field lines around a bar megnet.

* A tangent drawn at any point on the magnetic field line always indicates the direction of magnetic field. Two field lines never intersect.
* A magnetic field is created around an electric wire. In case of a straight current carrying wire, the magnetic field lines are arranged in concentric circles around the wire on a plane perpendicular to the wire. Their directions can be found with the help of right hand rule.



A pattern of concentric circles indicating the field lines of a magnetic field around a straight conducting wire.

* A number of parallel lines are drawn to represent a uniform magnetic field. A number of divergent lines are drawn to denote non uniform magnetic field.
* The magnetic field of a solenoid carrying a current is similar to that of a bar magnet.

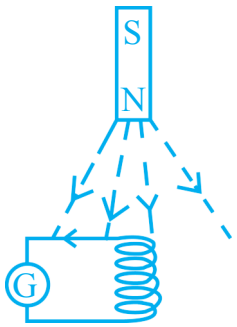


Field lines of the magnetic field through and around a current carrying solenoid.

* A current carrying conductor when placed in a magnetic field experiences a force. The direction of this force can be determind by Fleming's lift-hand rule.

This is the basis of an electric motor.

* When the number of field lines associated with the coil changes, an electromotive force is induced in the coil. This is called electromagnetic induction.



An electric current is induced due to relative motion between a magnet and closed coil.

* The direction of the induced current is obtained from Fleming's right hand rule.

* The device that converts mechanical energy into electrical energy is called a generator. It works on the principle of electromagnetic induction.
* AC electric power of 220 V with a frequency of 50 Hz is being supplied to our house. One of the supply wires is with red insulation, called live wire. The other one is of black insulation, which is a neutral wire. The green insulated wire is called earth wire.
* Fuse is used for protecting the circuits due to short circuiting or overloading of the circuits.

A. Multiple choice type questions : (mark-1)

1. The magnetic field intensity is defined by the force experienced by
   a) a compass needle b) a unit positive charge
   c) a unit negative charge d) single north pole
   Ans .
2. If a magnet is divided into two pieces then -
   a) each pieces will have two separate poles. b) two pieces will have even poles.
   c) two pieces will have two odd poles. d) none of the above.
   Ans.
3. Which of the following coatings is used to keep the device free from the effects of external magnetic field.
   a) Rubber coating. b) Glass coating. c) Iron coating d) Cloth coating.
   Ans.
4. The magnetic field intensity due to current carrying coil will be maximum at-
   a) any point b) the centre of the coil
   c) any point on the axis of the coil d) any point from the centre to the perimeter of the coil.
   Ans.
5. Which of the following is wrong?
   a) Induction occurs before attraction.
   b) We cannot separate a single pole.
   c) We can magnetised an iron ring.
   d) The magnetism of a permanent magnet does not change even after heating the magnet.
   Ans.
6. Which of the followings accurately describes the magnetic field near to a long straight wire ?
   a) The field consists of straight lines perpendicular to the wire.
   b) The field consists of straight lines parallel to the wire.
   c) The field consists of radial lines originating from the wire.

d) The field consists of concentric circles centred on the wire.

Ans.

7. Electromagnetic induction is -

a) the process of charging a body

b) the process of generating magnetic field due to a current passing through a coil

c) producing induced current in a coil due to relative motion between a magnet and the coil

d) the process of rotating a coil of an electric motor.

Ans.

8. When a positively charged particle (α– particle) is projected to the west, it is deflected north wards by a magnetic field. The direction of magnetic field will be –

a) towards south b) towards east c) down wards d) up wards

Ans.

9. SI unit of magnetic field vector is

a) oersted b) maxwell c) tesla d) gauss.

Ans.

10. A current carrying wire is placed in a magnetic field. The magnetic force on the conductor will be maximum when the conductor–

a) is along the magnetic field b) is opposite to the magnetic field

c) is perpendicular to the magnetic field d) is at 45^0 with the magnetic field.

Ans.

11. The magnetic field inside a long straight solenoid –

a) is zero b) decreases towards its edge

c) Increases towards its edge d) is equal at every points.

Ans.

12. The strength of an electromagnet does not depend on which of the following factors?

a) Electric Current.

b) Number of turns of coil.

c) Core material.

d) Direction of the electric current.

Ans.

13. The factors on which the force exerted on a current carrying conductor placed in a magnetic field depends on -

a) direction of current

b) direction of magnetic field

c) both a and b

d) None of the above

Ans.

14. The effective length of a magnet is -

a) The total length of the magnet b) the distance between two poles of the magnet

c) half the length of the magnet d) square of the total length of the magnet

Ans.

15. Electrical energy can produced from mechanical energy by-

a) Barlow wheel b) electric motor c) electric generator d) transformer.

Ans.

16. An electromotive force is induced in a conducting coil when its corresponding magnetic flux-

a) decreases b) increases c) decreases or increases d) remains the same.

Ans.

17. A proton enters freely in a uniform magnetic field perpendicular to the field. Which of the followings can change for the particle?

a) Mass b) Speed c) Velocity d) Magnitude of charge

Ans.

18. The potential of live wire of house-hold circuits is

a) 110 V b) 220 V c) 300 V d) 440 V

Ans.

19. In case of short circuit, the value of R is -

a) O b) ∞ c) 10 Ω d) 100^3 Ω

Ans.

20. The current in a circuit during short-circuit

a) decreases considerably b) increases rapidly c) changes d) None of the above.

Ans.

A. Fill in the blank.

1. We generally express _____ by the field lines.

2. Moving electron creates _____ field.

3. The north pole of a compass needle faces the _____ pole of a permanent magnet.

4. The place where magnetic field lines are densely closed, the magnetic field intensity is _____.

5. Magnetic field lines emanate from _____ pole of the magnet.

6. According to right hand thumb rule the direction of thumb is along the direction of _____.

7. When viewed from the south pole along the axis of a current carrying conductor, the direction of current flowing through the solenoid will be _____ clock wise.

8. No force is applied to a current carrying conductor when it is placed _____ to the magnetic field.

9. Red coloured insulating wires are used for _____ wires.

10. A generator converts mechanical energy into _____ energy.

11. The magnitude of _____ increases with increases in number of turns of solenoid.

12. The direction of a.c used in households in india changes its direction _____ times per second.

13. The direction of concentric field lines formed around a straight current carrying wire is _____.

14. Electromagnet is a _____ magnet.

15. SI unit of magnetic field intensity is _____.

B. True/Fales type questions (mark -1)

1. The magnitude of induced current can be increased by decreasing the rotational speed of coil.

Ans :-

2. A positive charge does not deviate from its original path while passing along the axis of a solenoid.

Ans :-

3. An electron does not deviate while passing through a region. This ensures that there is no magnetic field at that region.

Ans :-

4. The magnitude of induced emf depends only on the numbers of turns of the coil.

Ans :-

5. Fleming's left-hand rule helps us to determine the direction of the induced current.

Ans :-

6. A magnetic field is created around a magnet where the magnitude of magnetic force is determined.

Ans :-

7. Whenever a current carrying conductor is placed in a magnetic field, it always feels a force.

Ans :-

8. When a charged particle moves in a magnetic field, its energy does not change despite the action of a magnetic force acting on it.

Ans :-

9. The magnetic field lines at the centre of a long straight solenoid are parallel lines.

Ans :-

10. An electrician must use fuse wire with proper rating while replacing fuse.

Ans :-

11. Proper earthing is not essential in every household electrical circuit.

Ans :-

12. Two magnetic lines of force can intersect each other.

Ans :-

13. The pattern of a magnetic field lines due to the current carrying conductor depends on the shape of the conductor.

Ans :-

14. Electrical generator works on the basis of electromagnetic induction.

Ans :-

15. A pair of split rings are used as commutators in d.c. electric motor.

Ans :-

C. Assertion & Reason

(a) Assertion & reason both are correct and reason is the correct explanation of assertion.

(b) Assertion & reason both are correct but reason is not the correct explanation for assertion

(c) Assertion is correct but reason is not correct.

(d) Assertion is not correct but reason is correct.

(e)Assertion & reason both are wrong.

1. Assertion :- When a solenoid is hung freely, it aligns itself facing north-south direction like a bar magnet.

   Reason :- One end of the current carrying solenoid behaves like north pole and the other end like south pole.

2. Assertion :- A magnetic needle is placed near a current carrying wire. As the flow rate in the wire increases, the magnetic deflection decreases.

   Reason :- The magnitude of magnetic field intensity at the point near the current carrying wire increases with increasing current.

3. Assertion :- The magnetic force does not act on the free electron in a conductor kept in a magnetic field . They continuously stay dynamic.

Reason :- For a magnetic field, the force applied on the free electron acts perpendicular to the direction of motion of the electron.

4. Assertion :- In Fleming's left hand rule, the direction of magnetic field, force and electric current are perpendicular to each other.

Reason :- Fleming's left hand rule is used to determine the magnitude of induced electric current.

5. Assertion :- An induced emf arises only when current in the coil changes.

Reason :- The magnitude of the force can be determined by Flaming's thumb rule.

6. Assertion :- The magnetic field due to current carrying solenoid does not depend on the length and cross-sectional area of the solenoid.

Reason :- The magnetic field inside the solenoid is uniform.

7. Assertion :- The magnetic field at a point near the current carrying conductor is strong and its value decreases as it moves away from the conductor.

Reason :- The magnetic field due to a straight current carrying conductor is inversely proportional to the distance from the conductor.

8. Assertion :- Image of different parts of the body is obtained with the help of MRI technology.

Reason :- The magnetic field inside the body forms the basis of obtaining these images of different body parts.

9. Assertion :- Devices with metal structure have three pin connections where as in case of electric bulb, there are two pin connections.

Reason :- In case of three pin connections the connecting wires are less heated.

10. Assertion :- If a rectangular coil with fixed current hangs freely in a uniform magnetic field, no force acts on it.

Reason :- No force acts ever on a coil in a magnetic field.

11. Assertion :- A current carrying conductor feels a force in a magnetic field.

Reason :- The force exerted on a current carrying conductor in a magnetic field is caused by the interaction of the magnetic field produced by the current carrying conductor and the external magnetic field.

12. Assertion :- The direction of the magnetic field originated around the conductor changes with change in the direction of current flowing through a straight conductor.

Reason :- The direction of the magnetic field can be determined by using Fleming's left hand thumb rule.

13. Assertion :- In Fleming's left hand rule, the angle between the direction of magnetic field and current may not be always 90^0.

Reason :- The direction of the current can be determined by Maxwell's corkscrew rule.

14. Assertion :- The intensity of the magnetic field generated at the centre of a current carrying circular coil increases with increasing the number of turns in the coil.

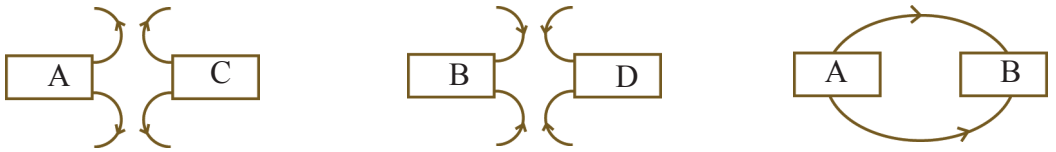
Reason:- The magnetic field intensitty is proportional to the number of turns in the coil.

15.Assertion:- Alternating current (A.C) is used to supply electricity to the house.

Reason:- Alternating current transmits far away without dissipating too much energy.

E. Very short answer type or one word type questions :- (1 mark each)

1. What is the nature of magnetic field lines due to a straight conductor?
2. Which property of magnet was used to make compass?
3. Write the name of a magnetic substance?
4. Write a property of magnetic field lines.
5. You are given the pattern of a magnetic field of a magnet. How do you say where the magnetic field is strong?
6. How is the field lines of a uniform magnetic field?
7. When the force on a current carrying conductor placed in a magnetic field is maximum?
8. Three images showing the field lines between the poles of two magnets are given below. Identify the poles A, B, C, D.



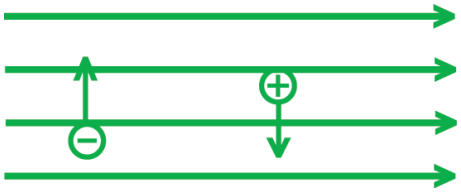
9. Who had invented first the magnetic effect of electric current?
10. How does the magitude of magnetic field change when an iron bar is inserted along the axis of a current carrying solenoid?
11. Who is responsible for the production of magnetism in human body?
12. Which law do we use to know the direction of induced current produced due to electro magnetic induction?
13. How does the pole of an electro magnet change?
14. Name a device that works on the principle of effect of magnet on current.
15. On which effcet of electric current does the electromagnet works?
16. How many times is the magnetic field created in the human body to the magnetic field of earth?
17. Write the name of a machine that converts electrical energy into mechanical energy?
18. Which instrument is used to change the direction of current in motor coil?
19. Which material is used as a core of the electrical motor coil?
20. What type of generator is used in electric power station?
21. Name two systems that are used for safety in electrical circuit and equipments.
22. What is the frequency of alternating current in Hz supplied to our house?
23. Why are the electrical equipments connected to circuit in our house connected in parallel?
24. What is short circuit?
25. Write a characteristic of fuse wire.

F. Very short answer type questions

1. From a wooden table, a thick wire is hanged. When the wire is connected with battery, an anti-clock-wise magnetic field is produced around the wire. Which end of the battery is connected to the- a) initial terminal and bottom terminal of the wire.
   b) Give the reason for your answer.
2. State the law for determining the direction of magnetic field due to current carrying wire.
3. Can two magnetic field lines intersect each other? Write with reason.
4. What is Maxwell's screw law?
5. On which factor does the magnitude of magnetic field intersity depend?
6. What is solenoid? How is it differ from general coil?
7. a) When a magnetic needle is brought closer to a current carrying wire, the needle get deflected. Why?

b) How is the change in deflection if we increase the magnitude of current thorugh the wire?

8. What is magnetic lines of force? How can we determine the direction of magnetic field at any point?
9. Two circular wires A and B are placed very close to each other. If the current in the coil A changes then will electricity be induced in coil 'B'? Give reason.
10. What happens if a conductor moves perpendicular to the magnetic field?
11. A bar magnet is placed along the axis of a circular conducting coil. Now both the coil and the magnet were moved in the same direction at same speed. Will an electricity be induced in the coil? Give reason.
12. On which factors does the magnetic field due to a coil depend?
13. What is the role of core in electromagnet?
14. Why it is more convenient to use electromagnet than permament magnet?
15. What is the necessity of earthing in electrical equipments?
16. Why are the electrical devices connected in parellel in household circuits?
17. A positively charged particle 'X' and a negative paticle 'Y' are moving perpendicular to a uniform magnetic feild at any instant. Determine the directon of the magnetic force applied to those particles at that moment.



18 Two circular conductors ‘A’ and ‘B’ are perpendicular to each other. If current flows in one, will an induced current be generated in the other? Give reason.

19. Write two differences between direct current and alternating current.

G. Short answer type question.

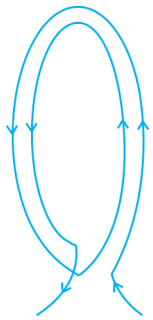
1. In Oersted’s experiment, the north pole of magnetic needle will get deflected in which direction for the following?

a) When the wire is placed below the needle. Current is flowing from north to south.

b) When the wire is held above the needle and current flows from north to south.

c) When the wire is held above the needel and direction of current is from west to east.

2. Current is flowing in a conducting coil. The following figure shows it. Draw its magnetic field lines. Which side of the coil will have north pole and which side will have south pole?



3. A coil of insulated wire is connected to a galvanometer. Explain what will happen, if the north pole of a bar magnet is

a) pushed rapidly into the coil. b) held stationary inside the coil.

c) withdrawn rapidly from the coil.

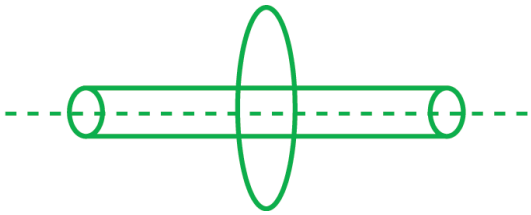
4. What would be the change in magnetic field produced by a current carrying circular wire if –

a) the magnitude of electric current is inceased in it

b) A point ‘p’ nearest to the coil is taken away from the coil

c) the number of turns of the coil is increased

5. What are the conditions for producing electromagnetic induction. A cylindrical bar magnet is placed along the axis of a circular coil as shown in the figure below. If the magnet is rotating about the axis, then will current be induced in the coil? Explain.



6. State the principle of electric generator. Write the name of two sources of direct current and alternating current.

7. Fuse is the most important device in electrical circuit. Why? An electric oven with 2 kW power rating is connected to a 220 V voltage in the house hold circuit. The current rating of the circuit is 5 A. What kind of results do you expect? Explain.

8. State the rule to determine the direction of a - i) magnetic field produced around a straight conductor carrying current, ii) force experienced by a current carrying straight conductor placed in a magnetic field which is perpendicular to it, iii) current induced in a coil due to its rotation in a magnetic field.

9. Name two safety measures commonly used in electric circuits and appliances. What precaution should be taken to avoid the over loading of domestic electric circuits. What is the difference between Fleming's right hand and left hand rule?

10. Which device can be used to convert alternating current into direct current? Why a.c. is preferred over d.c for power supply over a long distance.

11. What colours of wire are used for live, neutral and earth wire? You want to connect a 2 kW electric oven in the electric circuit. In which power line would you connect it and why? What may happen if you connect it wrongly in the other power line?

12. On which factors does the strength of the magnetic field produced by a current carrying solenoid depend?

13. Write one difference between electric force and magnetic force. Draw the patterns of magnetic field lines due to a current carrying solenoid. Write two procedure for producing magnetic field.

14. A current carrying conductor experiences a force when it placed in a magnetic field which is perpendiculer to it . State the rule to determine the direction of the force.

15. Current carrying solenoid behaves like a bar magnet– explain. What is the potential difference between live wire and neutral wire.

16. Which system is operative at house ac or dc? why?

17. Akash, studying in class V, asks his older brother Bishal who is studying in the class X, that how does the fan rotate. Bishal replies that the fan has a motor in which a dynamo converts electrical energy into mechanical energy. Akash asks to show it with the help of a functional model. Both of them

then make it with magnet, armature, connecting wire, switch, carbon brush, battery and wire. As soon as the electricity is given, Akash saw that the motor is rotating.

i) On which principle does electric motor work? state the principle.

ii) What is the function of an electric motor?

iii) Does electric motor use in water pump also?

18. Over loading in an electric circuit causes fire. Common people are unaware of this fact. Studying in the class X, Rohan told people of his locality about the overloading. He told them that it is necessary to take various precautions to avoid overloading.

i) What is overloading?

ii) What precautions should be taken to avoid the overloading of domestic electric circuits?

iii) On which effect of electric current does an electric fuse work?

19. An electrician was repairing the electric line at Ayan's house. As soon as he touches the metal part of an instrument, the man gets deadly shock. Ayan rushed him to the hospital after initial trearment.

i) Why did the man get shock?

ii) What kind of safety measures are taken to protect our home from dangerous shock and how does it protect us from shock?

Chapter 14

Sources of Energy

Chapter at a glance :

1. Sun is the source of all energy on earth. It has been radiating a lot of energy for the past 5 million years and will continue to do so for the next 5 million years too.
2. We utlise energy from various soruces to perform different tasks in our daily life. For an energy source to be efficinet enough, it should have the following characteristics -
   - It should be cheap, economic and easily available.
   - The cost of extracting of the energy from its source. Should be less.
   - It should be eco-friendly.
   - There should be enough technological skills to utilise energy from these resources.
3. To perform any task there is a need of selected energy or fuel. A fuel will be efficient only when–
   - It can perform a huge amount work per unit volume or mass.
   - It should be readily available.
   - It can be easily stored and transported.
   - It should be significantly cheaper.

4. The conventional sources of energy are -

i) Fossil fuels : These are extracted from the bottom of the soil. They are limited in quantites and since they are non-renewable, they need conservation. Due to their extensive use, these resources are getting exhausted. Burning of fossil fuels cause huge amount of air pollution.

ii) Thermal power plant : Fuels are burnt in thermal power plants to produce heat energy, that are later converted into electrical energy.

iii) Hydropower plant : High embarkments are constructed upon rivers to obstruct the flow of water and to collect water in large reservoirs. As a result water level inreases and by this process kinetic energy of the flowing water is converted to potential energy. Then the stored water above the dam is allowed to fall on the turbines placed at the bottom of the dam. This results in strong current of water causing the turning of turbines producing electricity.

iv) Biomass - Fuel sources which are obtained from plants and animals to generate heat / electricity are known as biomass. These are -

a) Wood - Though it is used since many years, it is unable to produce more heat but porduces more smoke.

b) Cowdung - It is not fully burnt but it also produces lesser amount of heat.

c) Biogas - It is an efficient fuel product which is produce in very little amount.

5. Alternative or non conventional sources of energy -

a) Solar energy : The main source of energy is solar energy. At present solar energy is used in various ways. e.g. Solar cooker, is used for cooking, hot water is obtainined by solar water heater and light is generated through solar cells.

b) Energy from sea :

i) Tidal energy : Tidal engery is harnessed by constructing dam across a norrow opening to the sea. A turbine fixed at the opening of the dam converts tidal energy to electricity.

ii) Wave energy : The waves are generated by strong winds blowing across the sea. By using this energy electricity can be generated.

iii) Ocean thermal energy : The water at the surface of the sea or ocean is heated by the sun while the water in deeper sea is relatively cold. This difference in temperature is exploited to obtain energy in ocean thermal energy conversion plants.

c) Geothermal energy : Steam trapped in rocks is routed through a pipe to a turbine and used to generate electricity.

d) Nuclear energy : A tremendous amount of Energy is generated due to Nuclear fission. By using this energy electricity is generated.

6. The arbitrary use of any energy source in any way disturbs the balance of the environment. As combustion of fossil fuel causes air pollution and the use of some devices, such as solar cell, does not cause pollution, but structural addition of this devices can damage the environment.

A) Select the correct answer form the following questions : **Mark-1**

1) In thermal power plant, fuels are used as -

a) Water b) Uranium c) Cow dung d) Fossil fuel

Ans :

2) Main source of energy is -

a) Sun b) Water c) Soil d) Air

Ans :

3) The energy which causes least pollution in environment is -

a) Geo-thermal energy b) Nuclear Energy c) Solar Energy d) Tidal energy.

Ans :

4) Which one of the following is a non renewable source of Energy?

a) Sunlight b) Air c) Water flow d) Fossil fuel.

Ans :

5) Main component of biogass is -

a) Methane b) CO_2 c) H_2S d) Hydrogen.

Ans :

6) Choose the correct statement -

a) Sun is the ultimate source of energy b) Fossil fuels are unlimited in earth.

c) Hydrothermal plant doesnot cause any pollution to the environment. d) From nuclear reaction the nuclear products are easily degraded.

7) Choose the in correct sentence :

a) More trees need to be planted for biomass fuel.

b) In the absence of oxygen biogas is obtained by decomposing the cowdung.

c) The use of CNG does not cause any harm to the environment.

d) At present, India is also generating electricity by using nuclear energy.

8) Which is done using solar cells ?

a) To cook b) Ignite the fire c) Boiling water d) All of these

Ans :

9) In Bio energy turbine, the minimum wind speed should be–

a) 1 Km/h b) 5 Km/h c) 8 Km/h d) 15 Km/h

Ans :

10) Which of the following fuels has high heat generation capacity?

a) Biogass c) Fssil fuel c) Wood d) Cowdung cake

Ans :

B. Fill in the blanks : **Mark-1**

1) Hydro power plants convert the _____ of flowing water into electricity.

2) As a result of the combustion of fossil fuel _____ oxides are generated.

3) Carbon dioxide is the main _____ gas.

4) Biogas is produced in absence of _____ gas.

5) Bio-gas contains upto _____% methane gas.

6) By using solar energy _____ can be used to cook.

7) The main source of energy is _____.

8) _____ and petroleum is the most widely used fossil fuel.

9) To generate water vapour in thermal power plant _____ fuel is burnt.

10) Hydropower is a type of _____ energy source.

C) Correct the wrong statements : Mark -1

1) Cowdung cake is a type of fossil fuel.
2) Rotational motion is used by wind mills to generate electricity.
3) The use of fossil fuel is a cause of acid rain.
4) The static energy of water in a thermal powerplant is converted to electricity.
5) Hydropower is a source of renewable energy.
6) The heat productivity of biogas is of high quality.
7) Silicon is used in the construction of Solar Cells.
8) Energy from the occan is available in the form of tidal energy, wave energy and marine thermal energy.
9) The basis of hydrogen bomb is the reaction of thermal nuclear fusion.
10) Coal is a renewable source of energy.

D) Answer the following question : Mark-1

a) Both assertion (A) and Reasons (R) are correct and Reason (R) is the correct explanation of Assertion (A).
b) Both Assertion (A) and Reason (R) are correct, but Reason (R) is not the correct explanotion or Assertion (A).
c) Assertion (A) is correct but Reason (R) is wrong.
d) Assertion (A) is wrong but Reason (R) is correct.

1) Assertion (A) : To complete the work we use different sources of energy.
Reason (R) : We use muscular energy to ride bicycle to school
2) Assertion (A) : If a plate is released from a height, it touches the ground while making a sound.
Reason (R) : Static energy is converted to sound energy.
3) Assertion (A) : Burning of coal and petroleum causes environmental pollution
Reason (R) : Due to Burning of coal & petroleum alkaline oxide is generated.
4) Assertion (A) : In Hydrothermal power plant vapour is generated.
Reason (R) : In Hydro thermal power plant, huge amount of fossil fuels are burnt.
5) Assertion (A) : In Hydropower plant, the static energy is converted into electric energy.
Reason (R) : In India essential energy is obtained from 1/4 % of hydropower plant.

6) Assertion (A) : Methane gas is a kind of green house gas.
Reason (R) : The amount of methane gas is highest in Biogas.
7) Assertion (A) : Cowdung cake is used as a source fuel.
Reason (R) : The number of cattle in India is much higher.
8) Assertion (A) : Methane is present in biogas in high amount.
Reason (R) : In biogas percentage of CO_2, Hydrogen, H_2S is minimal.
9) Assettion (A) : Though solar cell does not create any environmental pollution but its use is less.
Reason (R) : Machines using solar cells are expensive.

E) Answer the following questions in one sentence : Mark-1

1. Give one example of renewable source of engery.
2. What is the primary source of energy on earth?
3. Which gas is referred as biogass ?
4. What energy is used to light street light?
5. Name one heat generating process ?
6. Burning of which fuel causes acid rain?
7. Which type of fuel is used in thermal power plant?
8. Which type of gas is abundantly found in biogas?
9. Which energy is used to generate electricity in wind mills?
10. Name one alternate source of energy.
11. Which substance is used in construction of solar cells?
12. What is the place of India in the world terms of wind power generations?
13. Which type of fuel is highest in demand in India?
14. What is the percentage of methane in Biogas?
15. In which state of India the largest wind energy farm has been established?
16. Name one green house gas ?
17. In which place of Maharastra nuclear energy plant is located?
18. Write the name of a radio active element?
19. Name one renewable source of energy?
20. Which green house gas is occasionally found in the water of the dam that is built on the river of the hydropower plant?

F) Answer the following questions in one sentence : Mark-1

1) Write the full form of CNG.

2) What chemicals are present in the Bilgas Slurry that makes it a good fertilizer?
3) How charcoal is made?
4) What is heat generating reaction?
5) What is efficient fuel?
6) Define fossil fuel?
7) Name the oxide of substances that are formed as result of fossil fuel burring?
8) Name two green house gases?
9) What do you mean by biogas ?
10) What are the uses of solar cooker?
11) Which reaction is the source of energy for sun and other stars?

G) Short answer type questions : **Marks-2**

1) What are fossil fuels?
2) What do you mean by renewable source of energy?
3) How elecricity is generated in thermal power plant?
4) How cowdung gas is generated?
5) Why methane is referred as efficient fuel?
6) Why wind energy is known as renewable source of energy.
7) Write two uses of solar energy.
8) What is nuclear fusions?
9) What are the limitations of solar cooker?
10) What is the source of renewable energy?
11) What is solar constant?

H) Long answer type questions : **Marks-5**

1) What are the qualities / characteristics of ideal source of energy? Name one ecofriendly fuel. Give two advantage of using solar cell.
2) What is cowdung cake? Why biogas is considered as efficient fuel? Draw a neat diagram of biogas power plant.
3) Define fossil fuel? How it is harmriful to the environment ?
4) What are efficient fuel? Write their characte stics? Write the limitations of using wind energy?
5) What is the primary source of energy? What would you like to suggest to reduce the cost of energy?

Chapter 15

OUR ENVERONMENT

CHAPTER AT A GLANCE :

1) All organism such as plants, animals, microrganisms and human beings as well as the physical surroundings interact with each other and maintain a balance in nature.

2) All the interacting organism in an area together with the non living constituents of the environment form an ecosystem.

3) The producers make the energy from sunlight available to the rest of the ecosystem.

4) The green plants in a terrestrial ecosystem capture about 1% of the energy of sunlight that falls on their leaves and convert it into food energy.

5) An average of 10% of the food eaten is turned into its own body and made available for the next level of consumers.

6) Since so little amount of energy is available for the next level of consumers, that's why food chains generally consists of only three or four steps.

7) Each organism is generally eaten by two or more other kinds of organism which in turn are eaten by several other organisms so instead of a straight food chain, the relationship can be shown as a series of branching lines called a food web.

8) Unknowingly, some harmful chemicals enter in our bodies through the food chain. As because these chamicals are non degradable, these get accumulated progressively at each trophic level. This phenomenon is known as biological magnification.

9) We are integral part of the environment. Changes in the environment affect us and our activities change the environment around us, sometimes our activities pollute the environment.

10) The amount of ozone in the atmosphere began to drop sharply in the 1980's; this decrease has been linked to synthetic chemicals like CFC which are used as refrigerants and in fire extinguisher. In 1987, UNEP succeeded in forging an aggrement to freeze CFC production.

11) Our activities may lead to biodegradable or non-biodegrable wastes and if we do not take proper Measures, it may cause many harmful effects.

A) Find out the correct answer from the following questions : **Mark-1**

1. An Ecosystem is formed by-
   a) Biotic component
   b) Abiotic components
   c) Both Biotic and abiotic components
   d) None of the above

Ans:-

2. Which of the following is not a natural ecosystem ?
   a) Forest
   b) Pond
   c) Cropland
   d) Lake

Ans:-

3. Each step of the food chain is called-
   a) Trophic level
   b) Consumer level
   c) Producer level
   d) Decomposer level

Ans:-

4. Which of the following is an abiotic component ?
   a) Bacteria
   b) Soil
   c) Plant
   d) Fungus

Ans:-

5. Which of the following organism has the largest number of population in an ecosystem?
   a) Herbivore
   b) Carnivore
   c) Omnivore
   d) Producer

Ans:-

6. Wheat → Mice → Snake → Eagle. In this given food chain snake belongs to which trophic level ?
   a) First (T_1)
   b) Second (T_2)
   c) Third (T_3)
   d) Fourth (T_4)

Ans:-

7. Which of the following remains as the non-biodegradable component in the environment ?
   (a) Paper
   (b) Milk packet
   (c) Used tea leaves
   (d) Torn clothes

Ans:-

8. If a butterfly sucks honey from a flower, then role of that butterfly in food chain is-
   a) Decomposer
   b) Primary consumer
   c) Secondary consumer
   d) Tertiary consumer

Ans:-

9. In which decade amount of ozone in the atmosphere began to decrease rapidly ?
   a) 1970
   b) 1980
   c) 1990
   d) 1940

Ans:-

10. Energy flow in ecosystem is -
   a) Unidirectional
   b) Multidirectional
   c) Unidirectional and Multidirectional
   d) None of the above

Ans:-

B) Fill in the Blanks : **Mark-1**

1. The biotic and abiotic components of a specific area together constitutes _____ .
2. The green plants in a terrestrial ecosystem capture _____ energy of sunlight that falls on their leaves.
3. Generally in an ecosystem a greater number of individuals are present at the lower tropic levels; so greatest number of them are _____ .
4. The amount of energy received at each tropic level is gradually _____ due to the loss of energy at each trophic level of food chain.
5. Several non biodegradable chemical pesticide which are used in agricultural field accumulate at _____ rate that causes biological magnification.
6. _____ is a chemical substance that is used as refrigerants and fire extinguisher which is involved in ozone layer depletion.
7. _____ substances remain inactive for a long period of time in the environment.
8. Improvements in our life style have resulted in greater amounts of _____ generation.
9. Changes in packaging have resulted in much of our _____ management.
10. Producers are present in _____ trophic level.

C. Choose the correct option from the following set of Assertion and Reason : **Mark-1**

a) Assertion (A) and Reason (R) both are correct and Reason (R) is the correct explanation of Assertion (A).

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

c) Both Assertion (A) and Reason (R) are wrong.

d) Assertion (A) is correct but Reason (R) is Wrong.

1. Assertion (A) : For the survival of the organisms, they are directly and indirectly dependent on the producers.
   Reason (R) : Because, producers are capable of producing food in the process of photo systhesis.
   Ans:-

2. Assertion (A) : Bacteria and fungi are known as decomposers of ecosystem.
Reason (R) : All these organisms of the ecosystem can transform the light energy into chemical energy.

Ans:-

3. Assertion (A) : Ozone is a deadly poisonous gas, yet it is important to us.
Reason (R) : Because it protects the earth's surface from the ultraviolet rays of sun.

Ans:-

4. Assertion (A) : Everyone should use paper bags instead of plastic bags.
Reason (R) : Because paper bags are cheaper than plastic bags.

Ans:-

5. Assertion (A) : All the manufacturing companies make CFC free refrigerators throughout the world.
Reason (R) : Because no other freezer like CFC has been discovered.

Ans:-

6. Assertion (A) : Some biodegradable wastes are generated by our daily activities.
Reason (R) : Because these are reduce by enzymes.

Ans:-

7. Assertion (A) : Studying the food chain has shown that if any nonbiodegradable sub stance enters the food chain, then it increases the density of the substance and its concentration become highest at top level of the food chain.
Reason (R) : It happens due to biological magnification.

Ans:-

8. Assertion (A) : The amount of energy available at each trophic level of the food chain is gradually increasing.
Reason (R) : Because energy is wasted at every level of the food chain.

Ans:-

9. Assertion (A) : Lake is an example of artificial ecosystem.
Reason (R) : Because it is man made.

Ans:-

10. Assertion (A) : A food web is made up of many food chains.
Reason (R) : Because each organisms intake two or more different types of organisms.

Ans:-

D) Write dawn the answers of following questions in one word or one sentence : Mark-1

1. What is environment ?

Ans:-

2. Make a food chain with grasshoppers, frogs, grasses and snakes.

Ans:-

3. Write the full from of UNEP.

Ans:-

4. Write the name of a disease caused by ultraviolet rays in our body.

Ans:-

5. Which organisms are present at the lowest trophic level of a food chain ?

Ans:-

6. What is biome?

Ans:-

7. What is flora and fauna ?

Ans:-

8. Give an example of necton and benthos.

Ans:-

9. Who are the decomposers of ecosystem ?

Ans:-

10. Which gas is mainly responsible for depletion of ozone layer ?

Ans:-

11. What is trophic level ?

Ans:-

12. Who gave the 'Ten Percent law' of energy flow ?

Ans:-

13. Write one example of phytoplankton and zooplankton.

Ans:-

14. What is the main harmful component of smoke emitted from automobiles?

Ans:-

15. Name two artificial ecosystem ?

Ans:-

16. How much percentage of food eaten is taken into its own body and made available for the next level of consumers ?

Ans:-

17. Write the name of a greenhouse gas ?

Ans:-

18. Which layer of the atmosphere contains ozone gas ?

Ans:-

19. Complete the following reaction-

$$O_2 \xrightarrow{UV} O + O$$

$$O + O_2 \longrightarrow \ ?$$

Ans:-

20. What is the source of energy in ecosystem ?

Ans:-

E) Briefly answer the following questions : **Marks-2**

1. What will happen in the absence of decomoposer in ecosystem ?
2. The flow of energy is always unidirectional explain with example.
3. Differentiate between food chain and food web.
4. Differentiate between producers and decomposers.
5. Illustrate with an example how biomagnification occur.
6. Draw a structure of food pyramid and mark the different trophic levels.
7. Name two biodegradable and non-biodegradable substances each that are found at your home, school premises and market, etc.
8. Mention two ways in which biodegradable substances can influence/ affect the environment.
9. Give an example of food chain found in pond ecosystem ?

10. Can all the organisms of any trophic level be removed without causing any damage to the ecosystem ?

F) Short answer type question : **Marks-2**

1. (a) Give example of two electrical waste.
   (b) Write two differences between biodegradable and non-biodegradable substances.
2. (a) Name two chemical that causes depletion of ozone layer.
   (b) How does it damage the ozone layer.
   (c) Why is 1987 a important in terms of environmantal protection ?
3. Grass $\rightarrow$ Deer $\rightarrow$ Tiger
   The above food chain is a three step food chain. What are the trophic levels of deer and tiger in the food chain. What will happen if all the tigers of this food chain are removed.
4. Why is damage to the ozone layer a cause of concern? What steps are being taken to limit this damage ?
5. Why do we need proper waste management in our daily life? Mention a way to reduce the problem of waste disposal.
6. Prepere a food web of grass land ecosystem.
7. Briefly discuss the stages of energy flow in the ecosystem.

Chapter 16 Sustainable Management of Natural Resources

Chapter at a glance :

1. We need to use and develop our natural resources sustainably, such as forests, wildlife, water, coal and petroleum.
2. We need to be more aware of the problems caused by overuse of resources without thinking and take new inititives to tackle the problem without feeling powerless considering the scale of the problem.
3. For protecting the environment, we can reduce the pressure on the environment by 5 “R” i.e. refuse, reduce, reuse, recycle, repurpose in different jobs.
4. We need to keep in mind the interests of our four main partners in forest resouce management, namely the local people, the government forest department, the industrialists and the wildlife and nature enthusiasts.
5. The construction of dams has social, economic and environmental significance in retaining water resources. Larger dams have alternative arrangements. However in this case, the problem can be solved through the direct participation of the local people and the provision of facilities.
6. Different methods of water conservation can be applied in different regions and can be useful in water conservation.
7. For example, digging of small wells and reservoirs, setting up of simple watershed projects, construction of small dams made up of soil, installation of support units for collecting water in the root, etc. These systems refill groundwater table and also fill up the rivers.
8. Fossil fuels, coal, petroleum will get over one day, so they need to be used consciously, so that the environment can be saved from the pollution caused by their combustion.

A) Choose the correct answer from each of the questions below : Mark-1

1. "The Ganga Action Plan" began –

a) In 1990 b) In 1985 c) In 1995 d) In 1911

Ans :-

2. The presence of which of the following bacterias indicate that the water has been contaminated by pathogenic organisms -

a) Coliform bacteria. b) Cyanobacteria.

c) Both option 'a' and 'b' d) None of these.

Ans :-

3. Which of the following natural resources is called 'Biodiversity Hotspot' ?

a) Water. b) Coal and petroleum. c) Forest. d) None of these.

Ans :-

4. An ancient water conservation structure used in Kerala is -

a) Kulah. b) Cut. c) Tol. d) Tunnel.

Ans :-

5. Which of the following objects can be recycled ?

a) Glass. b) Dung. c) Peel the fruit. d) Waste food.

Ans :-

6. Which of the following works will help in the protection of our natural resouces -

a) Walking some distance. b) Wearing an extra sweater in winter.

c) Going ustairs using the stairs. d) All of the above.

Ans :-

7. The award recently introduced by the Govenment of India in memory of Amritadevi Bishnoi is - a) "Amritadevi Bishnoi National Award for wildlife conservation."

b) "Amritadevi Bishnoi National Award for water conservation."

c) "Amritadevi Bishnoi National Award for water and wildlife conservation."

d) None of these.

Ans :-

8. What is the meaning of the word "Reduce" used to protect the environment ?

a) Minimize the use of consumables. b) Recycling of consumables.

c) Absolutely no use of consumables.

d) Making necessary items by recycling the consumables.

Ans :-

9. “Khadin” is a system of water conservation, which can be seen -

a) In Himachal Pradesh. b) In Rajasthan. c) In Karnataka. d) In Tamil Nadu.

Ans :-

10. The only natural resource that we can’t use for eternity despite sustainable use is -

a) Forest. b) Wildlife. c) Water. d) Coal and petroleum.

Ans :-

11. The year in which Amritadevi Bishnoi along with 363 others sacrificed her life for the protection of Khejri tree at Jodhpur, Rajasthan is -

a) 1930. b) 1931. c) 1934. d) 1938.

Ans :-

12. The problem/shortage of which natural resource is faced by the villages near the water theme park in Maharashtra is ?

a) Wind. b) Soil. c) Water. d) Forest.

Ans :-

13. The conditions that are being created by the burning of excessive amounts of fossil fuels are -

a) Air pollution. b) Water pollution. c) Deforestation. d) Global warming.

Ans :-

14. The movement that started in 1970 at Gerwal’s Reni -

a) Appico movement. b) Silent Valley movement. c) Chipko movement. d) All of them.

Ans :-

15. Which of the following can be called ‘Hotspot’ Zone ?

a) Forest. b) Reservoir. c) Desert. d) Polar region.

Ans :-

B. Fill in the blanks : **Mark-1**

1. _____ bacteria are found in the human intestine.

2. To Protect the environment, 5 “R” means Refuse, Reduce, Reuse, Repurpose and _____.

3. Preserving _____ is essential if we want to give beautiful world as a gift to future generations.

4. _____ demand is growing at a rapid rate as the human population grows rapidly due to improved _____ service.

5. _____ occurs during the extraction of minerals from the earth’s surface because a large amount of metalic ____ has to be removed per ton of metal.

6. Towards the end of Vedic periods _____ emerged as the mainstay of the economy.

7. One of the main goals of conservation is to preserve our inherited _____.

8. Water is a _____ essential element for all terrestrial organisms.

9. Rainfall in India is mainly due to _____.

10. _____ problem is caused by arbitrary deforestation and loss of biodiversity.

11. Watershed management scientifically emphasizes _____ and water conservation to increase productivity.

12. Khadin in Rajasthan, Bandhara in Maharashtra, Bundi in Madhya Pradesh and Bundi, Ahar in Bihar etc., are some of the ancient water supply structures including water conservation system which are still in use today.

C) Indicate the possible answers to the following Assertion and Reason questions

Mark -1

a) Assertion (A) & Reason (R) both are correct & Reason is the correct interpretation of the Assertion.

(b) Assertion (A) & Reason (R) both are correct but the Reason is the not the correct interpretation of the Assertion.

(c) Assertion (A) & Reason (R) both are wrong.

(d) Assertion (A) is correct but Reason (R) is wrong.

1. Assertion (A) : Reuse to protect the environment is much better than the recycling process.
Reason (R) : Energy is not used in this process.

Ans :-

2. Assertion (A) : A long-term plan is needed for the use of natural resources.
Reason (R) : So that these are sustainble for the next generation and does not get exhausted for mere short term profit.

Ans :-

3. Assertion (A) : During the Vedic period, emphasis was laid on the production of forest plants as well as their protection.
Reason (R) : Towards the end of the vedic period, agriculture emerged as the mainstay of the economy.

Ans :-

4. Assertion (A) : Rainfall in India mainly occurs due to monsoon.
Reason (R) : Therefore most of the total rainfall in India occurs within a few months of the year.

Ans :-

5. Assertion (A) : 'Narmada Bachao Andolan' took place in protest against the rising height of Sardar Sarobar Dam built on the river Narmada.

Reason (R) : The main reason for this movement was to increase the navigability of the river.

Ans :-

6. Assertion (A) : Watershed management scientifically emphasizes on soil and water conservation to increase productivity.

Reason (R) : Its goal is to increase the primary natural resources, such as soil and water, maintaining ecological balance and creating secondary reasources for the use of plants and animals.

Ans :-

7. Assertion (A) : Extensive forests in independent India were converted into single forests of pine, teak and eucalyptus.

Reason (R) : Because, in independent India, the 'Forest Department' took over the control of the forest from the British indeed, but the knowledge of the local people and the needs of the local people were always neglected in the management of the forest resources.

Ans :-

D) Answer the following questions in one word or one sentence : Mark-1

1. Name the greenhouse gas produced during burning of fossil fuel.

Ans :-

2. What is the structure of "Ahar" used in Bihar?

Ans :-

3. Where did the chipko movement take place?

Ans :-

4. Amritadevi Bishnoi and her followers sacrificed their lives for the protection of which tree?

Ans :-

5. When was the National Implementation Braanch set up to clean the Ganga?

Ans :-

6. Write the name of a product that can be reused for different purposes.

Ans :-

7. Tehri dam was built on which river?

Ans :-

8. What is Silvi culture?

Ans :-

9. Write the name of an industrial factory based on forest resources.

Ans :-

10. Write the name of a resource that rotates in a circle.

Ans :-

11. Name a product that you can reuse.

Ans :-

12. Who won the 'Stockholm Water Prize' in India?

Ans :-

13. What is catchment area?

Ans :-

14. In the field of conservation of energy, name two devices based on solar energy devices based.

Ans :-

15. What are the two common rules regarding vehicle smoke emissions?

Ans :-

16. What gases are released into the air during combustion of petroleum products?

Ans :-

17. Write the names of two forest resources on the basis of which an industrial factory can be built.

Ans :-

18. Name two forest resources used by a person living near a forest.

Ans :-

E. Answer the following questions : Marks - 2

1. What are the 5 'R' in protecting the environment?

Ans :-

2. Why should we use natural resources carefully ?

Ans :-

3. Write the importance of forest resources.

Ans :-

4. Give some reasons for people's disagreement over the construction of large dams.

Ans :-

5. Think about what you as a person can contribute to forest and wildlife management.

Ans :-

6. What is ‘Global warming’? What are its main causes ?

Ans :-

7. Write the name of any four water supply structures used in different states of India for water conservation which has been used since ancient times till date.

Ans :-

8. Suggest some ways to save the forest.

Ans :-

9. Write a short note on ‘Amritadevi Bishnoi’ movement.

Ans :-

10. What are the different advantages of resources management with short term goals ?

F. Answer the following questions in short : **Marks-3**

1. Why are forests and forest resources called as biodiversity hotspots ?
2. Write short notes on ‘Kulhas’ of Himachal Pradesh.
3. Draw and label an ideal ‘Khadin’ system.
4. Illustrate one ground water conservation procedure.
5. Who are the ‘stake holders’ of forests? Among them whose participation is important for forest conservation and why?
6. **(A) Match the following :**

Column- I	**Column -II**
a) Maharashtra	i) Kuttas
b) Kerala	ii) Eris
c) Karnataka	iii) Bandharas
d) Tamilnadu	iv) Surangams

7. What is check dams?
8. Briefly explain the consequences of gobal warming.
9. Which changes do you want in your home to create an environment friendly atmosphere?
10. What are the advantages of refilling ground water ?
11. Explain the significiances of sancturies and national parks for wild animal conservation.