Government of Karnataka

Department of School Education and Literacy

District Institute of Education and training Hassan

Hema Deevige

Science

10th Standard

2022–23

Applied Questions & Answers Bank

SSLC Science Question Paper Pattern

Marks distribution for themes the units covered under themes			
Sl No	**Theme**	**Units**	**Marks**
1	**Materials in Daily Life**	➢ Chemical reactions and Equations. ➢ Acids, Bases and Salts ➢ Metals and Non-Metals ➢ Carbon and Its Compounds ➢ Periodic Classification of Elements	25
2	**World of Living**	➢ Life Processes ➢ Control and Coordination ➢ How do Organisms Reproduce? ➢ Heredity and Evolution	22
3	**Natural Phenomena**	➢ Light: Reflection and Refraction ➢ Human Eye and Colourful World	12
4	**How do Things Work**	➢ Electricity ➢ Magnetic Effects of Electric Current	13
5	**Natural Resources**	➢ Sources of Energy ➢ Our Environment ➢ Management of Natural Resources	08

Objective Weightage			
Sl No	**Objective**	**Marks**	**%**
1	Remembering	16	20%
2	Understanding	32	40%
3	Applying	16	20%
4	Skill • Drawing skill • Higher Order Thinking Skill	12 4	20%
Total		**80**	**100%**

Weightage to type of questions				
Sl No	**Type of Question**	**Mark**	**No of question**	**Total marks**
1	MCQ	1	08	08
2	Very short answer	1	08	08
3	Short answer	2	08	16
4	Long answer	3	09	27
5	Long answer	4	04	16
6	Long answer	5	01	05
Total			**38**	**80**

Weightage to difficulty level			
Sl No	**Difficulty level**	**Marks**	**%**
1	Easy	24	30%
2	Average	40	50%
3	Difficult	16	20%
Total		**80**	**100%**

Internal Choice		
Sl No	**Marks distribution**	**Total marks**
1	2 x 2	04
2	3 x 4	12
3	4 x 1	04
Total		**20**

Government of Karnataka

Department of School Education and Literacy

Hema Deevige

Applied Questions & Answers

Science

English Medium

10th Standard

2022-23

District Institute of Education and training

Hassan

ಆಶಯ ನುಡಿ

2021-22 ನೇ ಸಾಲಿನಲ್ಲಿ ಜಿಲ್ಲೆಯ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ ಫಲಿತಾಂಶವು ಗುಣಾತ್ಮಕವಾಗಿ ರಾಜ್ಯಕ್ಕೆ ಪ್ರಥಮ ಸ್ಥಾನ ಗಳಿಸಿರಿರುವುದು ಶ್ಲಾಘನೀಯ. ಮೊದಲಿಗೆ ಉತ್ತಮ ಫಲಿತಾಂಶಕ್ಕಾಗಿ ಶ್ರಮಿಸಿದ ಜಿಲ್ಲೆಯ ಎಲ್ಲಾ ಸ್ತರದ ಅಧಿಕಾರಿಗಳು, ಮುಖ್ಯಶಿಕ್ಷಕರು ಹಾಗೂ ಶಿಕ್ಷಕರಿಗೆ ಅಭಿನಂದನೆಗಳು.

ಪ್ರಸ್ತುತ ಸಾಲಿನಲ್ಲಿಯೂ ಇದೇ ರೀತಿ ಗುಣಮಟ್ಟದ ಫಲಿತಾಂಶ ಪಡೆಯುವ ಸಲುವಾಗಿ ಹಲವು ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಜಿಲ್ಲೆಯಲ್ಲಿ ಅನುಷ್ಠಾನಗೊಳಿಸಿರುತ್ತೇವೆ.

ಈ ಸಾಲಿನ ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ ಪರೀಕ್ಷಾ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಸ್ವರೂಪದಲ್ಲಿ ಪುನಃ ಗಣನೀಯ ಬದಲಾವಣೆಗಳಾಗಿರುವುದರಿಂದ ನೂತನ ಮಾದರಿಯ ಪ್ರಶ್ನೆಪತ್ರಿಕೆ ಸ್ವರೂಪಕ್ಕನುಗುಣವಾಗಿ ವಿಜ್ಞಾನ ವಿಷಯದ ಅನ್ವಯ ಪ್ರಶ್ನೆಗಳು ಹಾಗೂ ಉನ್ನತ ಮಟ್ಟದ ಆಲೋಚನಾ ಪ್ರಶ್ನೆ ಹಾಗೂ ಮಾದರಿ ಉತ್ತರಗಳನ್ನು ಶಿಕ್ಷಕರಿಗೆ ಮತ್ತು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ನೀಡಿದರೆ ಅನುಕೂಲವಾಗುತ್ತದೆ ಎಂಬುದು ನಮ್ಮ ಚಿಂತನೆ.

ಆದುದರಿಂದ ವಿಜ್ಞಾನ ವಿಷಯದ ಅನ್ವಯ ಪ್ರಶ್ನೆಗಳು ಹಾಗೂ ಉನ್ನತ ಮಟ್ಟದ ಆಲೋಚನಾ ಪ್ರಶ್ನೆ ಹಾಗೂ ಮಾದರಿ ಉತ್ತರಗಳನ್ನು ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರಿಂದ ತಯಾರಿಸಲಾಗಿದೆ. ಇದನ್ನು ಸದುಪಯೋಗಪಡಿಸಿಕೊಂಡು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಅಭ್ಯಾಸ ಮಾಡಿಸಿ ಗುಣಮಟ್ಟದ ಫಲಿತಾಂಶವನ್ನು ನೀಡುತ್ತೀರೆಂಬುದು ನಮ್ಮ ಆಶಯವಾಗಿದೆ.

ಶ್ರೀಮತಿ ಪುಷ್ಪಲತಾ ಹೆಚ್ ಕೆ
ಉಪನಿರ್ದೇಶಕರು (ಅಭಿವೃದ್ಧಿ)
ಹಾಗೂ ಪ್ರಾಂಶುಪಾಲರು
ಜಿಲ್ಲಾ ಶಿಕ್ಷಣ ಮತ್ತಿ ತರಬೇತಿ ಸಂಸ್ಥೆ,
ಹಾಸನ ಜಿಲ್ಲೆ

ಪರಿಕಲ್ಪನೆ ಮತ್ತು ಮಾರ್ಗದರ್ಶನ

ಶ್ರೀಮತಿ ಪುಷ್ಪಲತಾ ಹೆಚ್.ಕೆ
ಉಪ ನಿರ್ದೇಶಕರು (ಅಭಿವೃದ್ಧಿ)
ಜಿಲ್ಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ತರಬೇತಿ ಸಂಸ್ಥೆ, ಹಾಸನ.

ಪರಿಕಲ್ಪನೆ ಮತ್ತು ಸಲಹೆ

ಶ್ರೀಮತಿ ವೇದಾವತಿ ಪಿ
ಹಿರಿಯ ಉಪನ್ಯಾಸಕರು
ಜಿಲ್ಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ತರಬೇತಿ ಸಂಸ್ಥೆ, ಹಾಸನ.

ಸಲಹೆ ಮತ್ತು ನಿರ್ವಹಣೆ

ಶ್ರೀಮತಿ ವಿಜಯಲಕ್ಷ್ಮೀ ಹೆಚ್.ಕೆ
ಉಪನ್ಯಾಸಕರು
ಜಿಲ್ಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ತರಬೇತಿ ಸಂಸ್ಥೆ, ಹಾಸನ.

ಶ್ರೀಯುತ ಗಿರೀಶ್ ಕೆ.ಆರ್
ಉಪನ್ಯಾಸಕರು
ಜಿಲ್ಲಾ ಶಿಕ್ಷಣ ಮತ್ತು ತರಬೇತಿ ಸಂಸ್ಥೆ, ಹಾಸನ.

ಸಾಹಿತ್ಯ ರಚನಾ ಸಂಪನ್ಮೂಲ ಶಿಕ್ಷಕರ ತಂಡ

ಶ್ರೀಯುತ ಕುಮಾರ್ಕೆ.ಬಿ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಅಗಲಹಳ್ಳಿ, ಹಾಸನ ॥ತಾ॥	**ಶ್ರೀಯುತ ಅಂಜನಪ್ಪ.ಕೆ.ಆರ್** ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಮುರುಂಡಿ, ಅರಸೀಕೆರೆ ॥ತಾ॥
ಶ್ರೀಯುತ ಸತೀಶ.ಬಿ.ಕೆ ಸ.ಪ.ಪೂ.ಕಾಲೇಜು, ಶ್ರವಣಬೆಳಗೊಳ, ಚನ್ನರಾಯಪಟ್ಟಣ॥ತಾ॥	**ಶ್ರೀಯುತ ಸೋಮೇಶ್ ಆರಾಧ್ಯ** ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಕೆಂಬಾಳು, ಚನ್ನರಾಯಪಟ್ಟಣ॥ತಾ॥
ಶ್ರೀಯುತ ಸಿದ್ದಪ್ಪ ಎಲ್.ಎಸ್ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಕುರುವಂಕ, ಅರಸೀಕೆರೆ ॥ತಾ॥	**ಶ್ರೀಯುತ ಜಯಂತ್.ಆರ್** ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಬನುಕುಪ್ಪೆ ಹೊಳೆನರಸೀಪುರ॥ತಾ॥
ಶ್ರೀಯುತ ವೇಣುಗೋಪಾಲ್.ಆರ್ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಹಂಗರಹಳ್ಳಿ, ಹೊಳೆನರಸೀಪುರ ।ತಾ॥	**ಶ್ರೀಯುತ ಧರ್ಮೇಂದ್ರ ವೈ ಎನ್** ಸ.ಪ.ಪೂ.ಕಾಲೇಜು, ಬಾಳೇನಹಳ್ಳಿ ಅರಸೀಕೆರೆ ॥ತಾ॥
ಶ್ರೀಯುತ ಆರ್.ಎಂ ಪಾಟೀಲ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಅನುಘಟ್ಟ, ಬೇಲೂರು ॥ತಾ॥	**ಶ್ರೀಯುತ ರಘು.ಕೆ.ಆರ್** ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ ಚಿಕ್ಕಕಣಗಾಲು ಆಲೂರು॥ತಾ॥
ಶ್ರೀಯುತ ಚಂದ್ರಶೇಖರ್ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಅರೆಕೆರೆ, ಅರಸೀಕೆರೆ ॥ತಾ॥	**ಶ್ರೀಮತಿ ರಮ್ಯ ಎಮ್.ಆರ್** ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಕರಗುಂದ, ಅರಸೀಕೆರೆ ॥ತಾ॥
ಶ್ರೀಮತಿ ಶೋಭ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಮೋಕಲಿ, ಅರಕಲಗೂಡು ॥ತಾ॥	**ಶ್ರೀಯುತ ವೆಂಕಟೇಗೌಡ ಬಿ.ಎಂ** ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಹಂಚೂರು, ಆಲೂರು ॥ತಾ॥
ಶ್ರೀಯುತ ಮೋಹನ್ ಕುಮಾರ್ ಎಸ್ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಬೆಳಗೋಡು, ಸಕಲೇಶಪುರ॥ತಾ॥	**ಶ್ರೀಯುತ ಪದ್ಮನಾಭ ಕೆ.ಎಸ್** ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ದೊಡ್ಡಬೆಮ್ಮತ್ತಿ, ಅರಕಲಗೂಡು ॥ತಾ॥
ಶ್ರೀಯುತ ಹರೀಶ್ ಜಿ ಆರ್ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಕೆಂಕೆರೆ, ಅರಸೀಕೆರೆ ॥ತಾ॥	**ಶ್ರೀಮತಿ ಸರಸ್ವತಿ ಬಿ** ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಹಡವನಹಳ್ಳಿ, ಚನ್ನರಾಯಪಟ್ಟಣ ॥ತಾ॥
ಶ್ರೀ ಯೋಗೇಶ್ ಎಸ್ ಹೆಚ್ ಸರ್ಕಾರಿ ಪ್ರೌಢಶಾಲೆ, ಹನ್ಯಾಳು, ಅರಕಲಗೂಡು ॥ತಾ॥	

Content

Chapter 1

Chemical Reactions and Equations

1. **Give an example of an endothermic reaction. (or)**
   Give an example of a chemical decomposition reaction. (or)
   Give an example of a thermal decomposition reaction. (1 mark)
   Ans: $CaCO_3 \rightarrow CaO + CO_2 \uparrow$
   Calcium carbonate Calcium oxide Carbon dioxide

2. **Why is nitrogen gas used for foods containing oil and fat? (or)**
   Why do manufacturers of chips put nitrogen gas in the package? (or)
   Reasons for adding antioxidants to foods containing fat and oil (1 mark)
   Ans: To prevent oxidation

3. **Why paint iron objects? (or)**
   Why should iron materials be kept away from moisture? (or)
   Why does zinc coat iron objects? (or)
   Why is iron mixed with other materials? (or)
   Why is galvanization done for iron materials? (1 mark)
   Ans: To prevent corrosion of metals.

4. **Zinc flakes react with dilute hydrochloric acid to release gas (or)**
   What is the gas released when zinc flakes react with dilute sulfuric acid? (1 mark)
   Ans: Hydrogen gas

5. **Why should magnesium strip be cleaned with sandpaper before firing? (or)**
   Why should the magnesium strip be kept away from the oxygen in the air? (1 mark)
   Ans: Magnesium oxide layer is formed

6. **Compost is formed by the decomposition of plant matter by which process (or)**
   By which process glucose combines with oxygen in our body cells to release energy. (or)
   Respiration is a type of chemical reaction. (1 mark)
   Ans: Exothermic reaction

7. **Which factor causes the white color of silver chloride to turn gray (or)**
   Which element causes the white color of silver bromide to turn gray? (1 mark)
   Ans: Sunlight

8. **Name the elements required to carry out a chemical decomposition reaction (OR)**
   State the various sources of energy that cause fission reaction to occur. (or)
   There are different types of energy required to break down a chemical compound. (1 mark)
   Ans: Electricity, Light, Heat

9. **What is an oxidation-reduction reaction? (or)**
   What is redox reaction? Give an example. (2 Marks)
   Ans: In a chemical reaction, if one reactant is oxidized and the other reactant is reduced, such a reaction is called an oxidation-reduction reaction.

Ex: $CuO + H_2 \rightarrow Cu + H_2O$

Copper oxide Hydrogen Copper Water

10. Give an example of a chemical double displacement reaction. (or)
Give an example of projection function. (1 mark)

Ans: $Na_2SO_4 + BaCl_2 \rightarrow BaSO_4 + 2NaCl$

Sodium sulphate Barium chloride Barium sulphate Precipitate Sodium chloride

11. When a green iron salt is heated strongly, its colour finally changes to brown and the odour of burning sulphur is given out.

a) Name the iron salt.
b) Name the type of reaction that takes place during the heating of iron salt.
c) Write a chemical equation for the reaction involved.

Ans: a) Ferrous sulphate
b) Decomposition reaction
c) $FeSO_4 \rightarrow Fe_2O_3 + SO_2 + SO_3$

12. A colourless. Lead salt, when heated, produces a yellow residue and brown fumes.

a) Name the lead salt.
b) Name the brown fumes.
c) Write a chemical equation for the reaction involved.

Ans: a) Lead nitrate
b) Nitrogen dioxide
c) $2Pb(NO_3)_2 \rightarrow 2PbO + 4NO_2 + O_2$

Chapter 2

Acids, Bases and Salts

1. **Latha had a strain of soup in her white cloth. When she rubbed with soup that strain turns red. After washing it with water it turns yellow. What is the reason behind it? (2 Marks)**
   Ans: Strain of soup contains turmeric when it acts with soap it turns red. Because soap is basic in nature. After washing with water, it turns yellow, because water is acidic in nature. Turmeric is one of the natural indicators it turns red in base, and it turns yellow in acid media.

2. **Three test tubes contain distilled water, acid solution and basic solution. How do you find them when only red litmus is given to you? (2 Marks)**
   Ans: Litmus paper dipped in each solution. In each process you should wash litmus paper with distilled water. According to the following observation you can find the solution.

Observation	Conclusion
○ No change in colour	- Distilled water.
○ Red litmus turns blue	- Base solution
○ Blue litmus turns red	- Acidic solution.

3. **Anitha's mother always warns her don't keep curd as well as sour food items in brass or copper containers? (or)**
   Use of curd as well as sour food items which are kept in brass or copper containers is harmful to the health. Why? (1 Marks)
   Ans: Because curd and sour food items are acidic in nature, which reacts with brass or copper and liberates hydrogen gas along with poisonous substances.

4. **HCl, HNO_3 exhibits acid in nature in aqueous solution, but alcohol and glucose do not exhibit acid in nature in aqueous solution. Give the reason. (or)**
   HCl, HNO_3 are the good conductor in aqueous solution, but alcohol and glucose does not conduct electricity in aqueous condition. Give the reason. (2 Marks)
   Ans: Because the dissociation of HCl or HNO_3 into hydrogen ions always occurs in the presence of water. Although an aqueous solution of glucose and alcohol contains hydrogen, these cannot dissociate in water to form hydrogen ions.

5. **In which condition does a farmer add lime powder to an agricultural field? What may be the reasons for this? Explain. (or)**
   Agricultural scientists have suggested adding a certain amount of lime powder to an agricultural field. Why? (2 Marks)
   Ans: Plants require a specific pH range for their healthy growth. The soil of his land is more acidic. Lime powder is a base. So, adding lime powder to the soil decreases the acidic property.

6. **There is no change in the colour of the red litmus and blue litmus paper when introduced into an aqueous solution of sodium chloride. After passing direct current through the same solution, red litmus changes into blue colour. Which product is responsible for this change? Which product is responsible for this change? Mention any two uses of this product. (3 Marks)**
   Ans: Sodium Hydroxide (NaOH) is responsible for the red litmus changes into blue colour.
   Uses:
   - De-greasing metals
   - To prepare soaps and detergents.
   - Paper making.
   - To prepare artificial fibers.

7. **$NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + X$ Name the compound X in this chemical equation. Compound X is a major component of antacids. Why? Explain the preparation of washing soda using compound X with the balanced chemical equation. (3 Marks)**

Ans: X in this chemical equation is Sodium hydrogen carbonate ($NaHCO_3$). It is used as a major component of antiacids as it is a basic salt and neutralizes excess acid in the stomach and provides relief.

Preparation of washing soda: It is obtained by heating baking soda, recrystallisation of sodium carbonate gives washing soda.

$2NaHCO_3 \rightarrow 2Na_2CO_3 + CO_2 + H_2O$

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

8. Name the gas liberated when an acid reacts with metallic carbonate. Write the chemical equation of the reaction when this gas is passed through lime water. What is the colour of the precipitate obtained in this reaction? (3 Marks)

Ans: * Carbon dioxide (CO_2)

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

* White precipitate.

9. A knife which is used to cut some fruit was immediately dipped into water containing drops of blue litmus solution. If the colour of the solution is changed to red, what inference can be drawn about the nature of the fruit and why? (1 Marks)

Ans: The fruit is acidic because acidic solution changes blue litmus solution red.

10. Take about 5ml of dilute sulphuric acid in a test tube and add a few pieces of zinc granules to it.

a) What do you observe on the surfaces of zinc granules?

Ans: Hydrogen gas bubbles are seen on the surface of zinc granules.

b) What do you observe when the gas being evolved is passed through the soap solution?

Ans: As hydrogen gas passes through soap solution, soap bubbles filled with hydrogen rises up.

c) Why are bubbles formed in the soap solution?

Ans: When hydrogen is passed through the soap solution hydrogen does not get dissolved in it and this gas tries to escape from the solution into the environment when it reaches the upper surface of soap solution it escapes as bubbles because in soap solution it had less space but as it entered the air it got more space to spread.

d) What do you observe when a burning candle is taken near a gas filled bubble?

Ans: When the soap bubbles are ignited with a burning candle, the bubble bursts and gas present in it catches fire with a pop sound.

e) What do you observe when acids like HCl, HNO_3 and CH_3COOH are taken instead of sulphuric acid?

Ans: The same observation is seen when sulphuric acid is replaced with HCl, HNO_3 and CH_3COOH.

11. Take 2 ml of dilute NaOH solution in a test tube and two drops of phenolphthalein solution is added to it. (4 Marks)

a) What is the colour of the solution?

Ans: Pink

b) When dilute HCl solution is added to the above solution drop by drop. Is there any colour change for the reaction mixture?

Ans: If dilute HCl is added to the solution then the colour of the solution fades. If we keep on adding HCl, the solution becomes colourless.

c) Why did the colour of phenolphthalein change after the addition of an acid?

Ans: HCl being a strong acid will neutralize NaOH.

d) Does the pink colour of the phenolphthalein reappear?

Ans: If a few drops of NaOH are added again to the same solution, the solution become basic and the colour of the phenolphthalein reappear.

12. **A student dropped a few pieces of marble in dilute HCl contained test tube. The evolved gas passed through lime water. (2 Marks)**
    1. **What change would be observed in lime water?**
       Ans: Lime water turns milky**.**
    2. **Write the balanced chemical equation for the above change:**
       Ans: $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$

13. **The pH values of four solutions A, B, C and D are 5, 12,8 and 9 respectively. Arrange them in the increasing order of their hydroxy ion concentration. Which solution among them has strong acidic property. Explain what happens if our mouth the pH of solution 'A'? (3 Marks)**
    - Increasing order of hydroxy ion concentration: A< C < D < B
    - Solution A has strong acidic property.
    - Tooth decay starts.

14. **When sulphuric acid is added to 1gm solid sodium chloride taken in a test tube, which gas is liberated. What changes do you observe when you test the gas with dry and wet litmus paper? What conclusion do you draw from this experiment? (3 Marks)**
    - HCl gas is liberated.
    - It doesn't change the colour of the dry litmus paper, but changes the colour of the Wet litmus paper.
    - Conclusion: hydrogen ions in HCl are produced in the presence of water. The separation of H+ ion from HCl molecules doesn't occur in the absence of water.

15. **What happens if too much acid is produced in the stomach? What is the remedy for this situation?**
    Ans: When too much acid is produced in the stomach causes pain and irritation. Using antiacid like milk of magnesia is remedy for this condition.

16. **Plaster of Paris should be stored in a moisture proof container. Why? (1 Marks)**
    Ans: Because Plaster of Paris absorbs moisture from the surroundings atmosphere to form hard solid known as gypsum.

17. **Fresh milk has a pH of 6. How do you think the pH will change as it turns into curd?**
    Ans: As milk changes to curd, the pH will be reduced because curd is acidic in nature.

18. **Milkman adds a very small amount of baking soda to fresh milk. (2 Marks)**
    a) Why does he shift the pH of the fresh milk from 6 to slightly alkaline?
    b) Why does this milk take a long time to set as curd?
    Ans: a) The milkman shifts the pH of the fresh milk from 6 to slightly alkaline because in alkaline condition milk does not set as curd.
    b) Since the milk is slightly basic, lactic acid produced to set the curd are neutralized by the base. Therefore, it takes a longer time for the curd to set.

19. **Give reason: Acid must be added to water and not vice versa during dilution. (Or)**
    While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?
    - The process of dissolving an acid or a base in water is highly exothermic.
    - If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns.
    - The glass container may also break due to excessive heating.

20. **Why does the medium become acidic in mouth? What are the ill-effects of this acidic medium? How can it prevent? (or)**
    "Sweet tooth may lead to tooth decay" explain why? What is the role of toothpaste in preventing cavities? (or)

How does enamel undergo damage due to eating chocolates and sweets? What should be done to prevent it? (2 Marks)

Ans: Tooth enamel is chemically calcium phosphate. Sugar present in chocolates and sweets gets broken to acids by bacteria present in the mouth. It starts corroding when pH falls below 5.5, food particles in the mouth degrade to produce acid which lowers the pH of the mouth. Doctors advise the use of paste to prevent tooth decay because these are alkaline and neutralize the acid produced.

21. A student accidentally touches a nettle plant while trekking. How can you help to reduce the pain and irritation caused by it? (1 Mark)

Ans: The leaves of nettle plant have stinging hair which releases methanoic acid. We can neutralize the pain and irritation of the acid by rubbing the area with the leaf of the dock plant. Dock plan produces base which neutralizes the acid.

22. Five solutions A, B, C, D and E when tested with universal indicator showed pH as 4, 1,11,7 and 9 respectively. Which solution is (a) neutral? (b) strongly alkaline? (c) strongly acidic? (d) weakly acidic? (e) weakly alkaline? Arrange the pH in increasing order of Hydrogen-ion concentration.

Ans: (a) Solution D is neutral (pH=7)
(b) Solution C is strongly alkaline (pH=11)
(c) Solution B is strongly acidic (pH=1)
(d) Solution A is weakly acidic (pH=4)
(e) Solution E is weakly alkaline (pH=9)

pH in increasing order of hydrogen ion concentration is: pH=11 < pH=9 < pH=7 < pH=4 < pH=1

23. Kamala was playing in the garden. She was stung by a wasp. Her mother immediately applied a coating of toothpaste on the affected area and then took her to the doctor.

a) What does wasp sting contain? (2 Marks)

b) Why did her mother apply toothpaste on the affected area?

Ans: a) Wasp sting contains venom which is acidic.

b) As toothpaste is basic in nature. So on applying it on the affected area, it neutralize the effect of acidic wasp sting.

24. In the chlor-alkali process of manufacture of sodium hydroxide,

a) Name the gas produced at a cathode and anode?

b) At which electrode is sodium hydroxide formed? (2 Marks)

Ans: a) Chlorine gas is given off at the anode and hydrogen gas at the cathode.

b) Sodium hydroxide is formed at the cathode.

25. What effect does the concentration of H^+ (aq) ions have on the nature of the solution?

Ans: Concentration of H^+(aq) can have a varied effect on the nature of the Solution. With an increase in H^+ ion concentration, the solution becomes more acidic, while a decrease of H^+ ions cause an increase in the basicity of the solution.

26. Does basic solution also have H^+ (aq) ions? If yes, then why are these basic in nature?

Ans: Yes, basic solution also has H^+ (aq) ions. However, their concentration is less as compared to the concentration of OH^- ions that makes the solution basic.

27. What happens when a solution of an acid is mixed with a solution of a base in a test tube? Name this reaction? (2 Marks)

- Salt and water formation takes place.
- Temperature increases.
- This reaction is called neutralization.

Chapter 3 Metals and Non-metals

1. **Why do metals usually look dull even though they are lustrous?**
   Ans: Due to Oxidized layer on metals

2. **State the properties of metals that lead to making tools like iron, hammer and axe.**
   Ans: Hardness

3. **What is the property of metal that they can be beaten into thin sheets?**
   Malleability

4. **Which is the property of gold because of which it can be used in embroidery? (or)**
   Name the property of metals because of which they can be drawn into thin wires.
   Ans: Ductility

5. **What is the property of the metals because of which they are used for making cooking utensils?**
   Ans: They are good conductors of heat and have a high melting point

6. **Give two examples of metals that are poor conductors of heat.**
   Ans: Lead and mercury

7. **Aluminum oxide and zinc oxide are known as amphoteric oxides. Give the reason.**
   - Aluminum oxide and zinc oxide exhibit both acidic and basic properties.
   - They react with both acids and bases to produce salt and water.

8. **Sodium and potassium metals are kept immersed in kerosene oil. Give the reason.**
   Ans: Sodium and potassium metals react rapidly and catch fire when exposed to air. So, they are stored in kerosene oil to protect them and to prevent accidental fires.

9. **A student burns magnesium metal in air. As a result, a white colored compound 'X' is produced.**
   a. **Name the compound 'X'**
   b. **What change does an aqueous solution of 'X' cause in litmus paper? Why?**

   Ans:
   a. 'X' is Magnesium oxide
   b. Red litmus turns into blue litmus color because the metallic oxides are basic in nature.

10. **Atomic numbers of element A and B are 12 and 8 respectively. What type of chemical bond can be formed between these elements? Why? (or)**
    Atomic numbers of element A and B are 12 and 8 respectively. What type of compound is formed by these elements? Why?
    Ans:
    - An ionic bond is formed between element A and B.
    - The electronic configuration of element A is 2, 8, 2 which donates 2 electrons to become a positive ion and
    - The electronic configuration of element B is 2, 6 and accepts two electrons to become a negative ion.
    - These ions are oppositely charged and form an ionic compound due to the strong electrostatic force of attraction.

11. In electrolytic refining of copper

a. Name the materials used in anode and cathode.

b. State the appropriate electrolytic solution.

c. Where is pure copper deposited?

Ans:

a. The impure metal is attached to the anode and the pure metal is attached to the cathode.

b. Copper sulphate solution

c. Pure copper is deposited on the cathode.

12. Metal sulphides and carbonates are converted into metal oxides during extraction of metals from their ores. Give the reason.

Ans:

- Extraction from metals from oxides is easier than extraction from metals from sulphides and carbonates.
- Oxygen can be easily reduced from metal oxides by reduction.

13. Generally, metals react with acids to release hydrogen gas but when reacted with nitric acid no hydrogen gas is released. Why?

Ans: Metals (except manganese and magnesium) do not release hydrogen gas when they react with nitric acid. Because

- Nitric acid is a strong oxidizing agent.
- It oxidizes the hydrogen produced to water.
- Nitric acid itself is reduced to any of the nitrogen oxides.

14. Reaction between compound 'X' and aluminum is used to join railway tracks.

a. Name the compound 'X'

b. Name the chemical reaction involved?

c. Write the chemical equation between compound 'X' and aluminum.

Ans:

a. Compound 'X' is Iron Oxide (Fe_2O_3)

b. It is a thermite reaction.

c. $Fe_2O_3(s) + 2Al(s) \rightarrow 2Fe(l) + Al_2O_3(s) + heat$

15. Allotropes of a nonmetal 'X' are 'Y' and 'Z'. 'Y' is the hardest natural substance and 'Z' is a conductor of electricity. Identify X, Y and Z.

Ans: X - Carbon
Y - Diamond
Z – Graphite

16. Name the components of solder. Why are these metals used in solders?

Ans:

- Lead and tin.
- These metals have a low melting point.

17. A metal that is liquid at room temperature is heated in air to separate it from its sulphide ore.

a. Name the metal in liquid form

b. Name the ore of this metal

c. Write the chemical equation involved in extraction of this metal.

Ans:

a. Mercury
b. Cinnabar (HgS)
c. $2HgS(s)+3O_2(g) \rightarrow 2HgO(s)+2SO_2(g)$
$2HgO(s) \rightarrow 2Hg(l)+O_2(g)$

18. Write the differences between calcination and roasting.

Calcination	Roasting
○ Used in converting carbonate ores into oxides ○ Involves heating strongly in the presence of limited air	○ Used in converting sulphide ores into oxides ○ Involves heating strongly in the presence of excess air

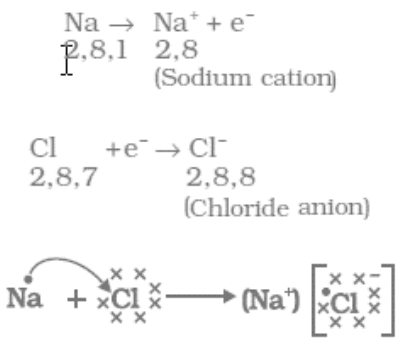
19. Give the reason for the following.

a. A thin coating of zinc is applied on steel and iron.
b. Silver articles become black after some time when exposed to air.
c. Copper vessels lose their brown colour and acquire a green colour when exposed to air.

Ans:

a. Iron and steel are coated with zinc to protect them against rusting.
b. Silver reacts with sulfur in the air to form a silver sulphide layer.
c. Copper reacts with moist carbon dioxide in the air to form a green substance called copper carbonate.

20. Draw electron dot structure for formation of sodium chloride.



21. Draw electron dot structure for formation of magnesium chloride.

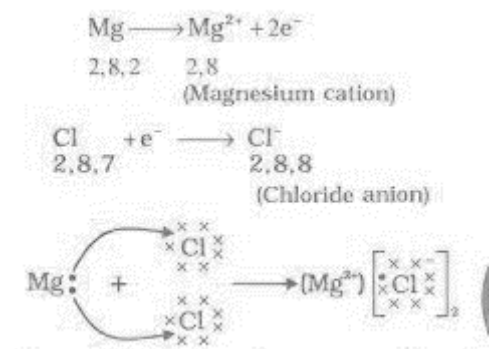


***Figure 3.6** Formation of magnesium chloride*

Chapter 4 Carbon and its Compounds

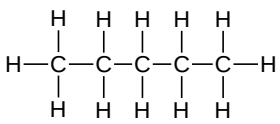
1. **What is a covalent bond? (or)**
   Name the bond formed between carbon atoms. (1 Mark)
   Ans: Bonds formed by sharing of electron pairs between two atoms are called covalent bond / covalent bond.

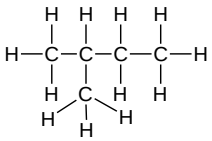
2. **Covalent (carbon) compounds have low melting points and boiling points. Give reason? (2 Marks)**
   Ans: Intramolecular bonds are stronger in molecules formed of covalent bond. But intermolecular force is very less. Because of this, the melting points and boiling points of covalent compounds are lower.

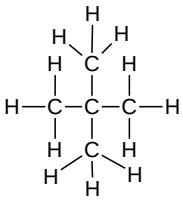
3. **Covalent compounds are generally poor conductors of electricity. Justify. (2 Marks)**
   Ans: Covalent compounds in which electrons are shared between atoms and no charged particles are formed. Hence, covalent compounds are generally poor conductors of electricity.

4. **No other element exhibits catenation property to the extent found in carbon compounds. Justify. (or)**
   Write two properties of carbon are responsible for the innumerable carbon compounds we see around us? (or)
   No more covalent bonds than triple bonds form between any of the carbon atoms. Why? (or)
   What causes carbon to form the most compounds? (or)
   State the cationization and tetravalent properties of carbon. (3 Marks)
   Ans:
   - Carbon bonds with other carbon atoms to form larger molecules. This property is called catenation.
   - Stable because the carbon-carbon bond is stronger. A large number of compounds are found in which carbon atoms are linked together.
   - The valency of carbon is four. Carbon is capable of combining with four other carbon atoms or with single valence elements. (Tetravalent property)
   - The bonds that carbon forms with other elements are quite strong, making these compounds more stable.
   - One reason carbon forms strong bonds is its small size. This causes the electrons to be strongly held by the nucleus of the atom.

5. **Name the compounds with the structural formula having the molecular formula C_5H_{12}. What are structural isomers? Write the structural formulae of isomers of pentane. (3 Marks)**
   Ans: Compounds with the same molecular formula but different structural formula are called structural isomers. The molecular formula of pentane is C_5H_{12} and its structural elements are:


n-pentane


Isopentane


neopentane

6. **How are saturated and unsaturated carbon compounds different? (or)**
   Alkanes are chemically stable. But the alkenes and alkenes are not stable. Justify. (2 marks)
   Ans:

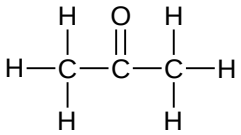
Saturated Carbon Compounds	Unsaturated Carbon Compounds
Carbon compounds with only single bonds between carbon atoms.	Carbon compounds with double or triple bonds between carbon atoms.
Usually not very active.	Generally, more reactive.
Alkanes	Alkene and alkenes

7. **Which is the first member of the group of ketones? Write its atomic formula and structural formula. (2 marks)**

Ans: First member of ketones- Propanone

Molecular formula of Propanone is – CH_3COCH_3

The structural formula of propanone is-



8. **Methanol, ethanol, propanol and butanol have similar chemical properties and general formula. Give reasons with their molecular formulas. (or)**
What is homologous series? State the homologous series properties of the first four membered molecular formulas of alcohols. (3 Marks)

Ans:

The molecular formulas of the first four members of the conformational series of alcohols are:

Methanol- CH_3OH, Ethanol- C_2H_5OH, Propenol- C_3H_7OH, Butanol- C_4H_9OH,

- A series of compounds in which a single reactive group displaces hydrogen in the carbon chain is called a conformational series.
- Have the same general formula.
- Have the same functional group.
- The difference between successive members is – CH_2.
- Mass difference between successive members is -14u.
- Have similar chemical properties.

9. **Identify the compounds which decolorize bromine solution in C_6H_{12}, C_3H_6, C_6H_{14}, C_6H_{10}, C_3H_8 and give suitable reasons for it. (or)**
State one chemical test that can be carried out to distinguish between saturated and unsaturated hydrocarbons. (2 marks)

Ans:

Saturated Hydrocarbons	Unsaturated Hydrocarbons
There is no change in the brown color of bromine.	Brown color of bromine disappears.
Butter does not undergo hydrogenation reaction.	Cooking oil undergoes hydrogenation to convert into solids.

10. **If you notice that the cooking gas/kerosene stoves used in your home are producing black colored smoke in large quantity with black colored flame and the bottom surface of the cooking utensils is black in colour, what should you do? (3 Marks)**

Ans: When the oxygen supply is low, fuels have incomplete combustion, giving off a black flame. Cooking gas/kerosene stoves have openings for air supply, which means that the air holes are blocked and fuel is being wasted.

When the air holes are cleaned, the air intake increases and the fuel burns with a clean blue flame when there is sufficient oxygen supply.

11. **A student diluted ethanol with alkaline potassium permanganate. What chemical compound can**

be formed? Why? (or)

The process of converting ethanol to ethanoic acid is called oxidation reaction. Why? (2 marks)

Ans: Alkaline potassium permanganate oxidizes ethanol to ethanoic acid. Oxidizing agents are capable of adding oxygen to other substances. Oxidation reaction takes place.

$$\underset{\text{(Ethanol)}}{CH_3CH_2OH} \xrightarrow[\text{Acidic } K_2Cr_2O_7 \ + \ \text{Heat}]{\text{Alkaline } KMnO_4 \ + \ \text{Heat}} \underset{\text{(Ethanoic acid)}}{CH_3COOH}$$

12. How will you test the gas formed when a piece of sodium is added to ethanol? Write the chemical equation for this process. (or)

A compound with the molecular formula C_2H_6O is used as a solvent and fuel. It reacts with sodium to form a colorless flammable gas. Identify this compound and write the equation for gas production. (3 Marks)

Ans: Alcohols react with sodium to release hydrogen gas. Gas makes a pop sound when burned.

$$2Na + 2CH_3CH_2OH \longrightarrow \underset{\text{Sodium ethoxide}}{2CH_3CH_2O^-Na^+} + H_2\uparrow$$

13. Compound 'A' having the molecular formula C_2H_6O reacts with the alkali $KMnO_4$ to form a compound 'B' having the odor of vinegar. 'A' reacts with H_2SO_4 to form C. Identify A, B and C. Write suitable equations. (2 marks)

Ans:

$$\underset{\text{(Ethanol)}}{CH_3CH_2OH} \xrightarrow[\text{Acidic } K_2Cr_2O_7 \ + \ \text{Heat}]{\text{Alkaline } KMnO_4 \ + \ \text{Heat}} \underset{\text{(Ethanoic acid)}}{CH_3COOH}$$

$$CH_3-CH_2OH \xrightarrow[H_2SO_4]{\text{Hot concentrated}} CH_2=CH_2 + H_2O$$

A=ethanol, B=ethanoic acid and C=ethene

14. The 2nd member of alcohol 'A' produces 'C' gas when it reacts with a dehydrating compound 'B' at 443K. Write the equation of this reaction and identify A, B and C. (or)

Write the chemical reaction that produces an unsaturated hydrocarbon from ethanol. (2 marks)

Ans:

$$CH_3-CH_2OH \xrightarrow[H_2SO_4]{\text{Hot concentrated}} CH_2=CH_2 + H_2O$$

A- Ethanol, B- Conc. H_2SO_4, C- Ethene

15. The compound $CH_3-\overset{\overset{O}{\|}}{C}-O-CH_2-CH_3$ is formed by the chemical reaction between the 2 different compounds A and B. Then find A and B. (or) (2 marks)

Name the chemicals used in the preparation of the compound $CH_3-\overset{\overset{O}{\|}}{C}-O-CH_2-CH_3$. Write the molecular formula. (or)

What is the esterification reaction? Write chemical equation. What are its applications? (or)

Write the chemical reaction in which ethanol and ethanoic acid react in the presence of an acidic reagent.

Ans:

$$CH_3-COOH + CH_3-CH_2OH \xrightarrow{\text{Acid}} CH_3-\underset{\underset{O}{\|}}{C}-O-CH_2-CH_3$$

Ethanoic acid + ethanol + (acidic catalyst) → ester

Esters are sweet smelling substances. Used in the preparation of aromatics and flavorings. Used in saponification process.

16. The four-carbon ester E reacts with NaOH to form the alcohol 'F' and the sodium salt 'G'. Where is the chemical reaction that takes place here used? Identify E, F, G and write the chemical reaction. (3 Marks)

Ans:

$$CH_3COOC_2H_5 \xrightarrow{NaOH} C_2H_5OH + CH_3COONa$$

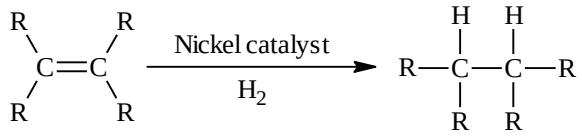
E esters react with sodium hydroxide to convert back to this alcohol (ethanol) F and the sodium salt of carboxylic acid (sodium acetate) G. Since this process is used in the manufacture of soap, it is called saponification process.

17. Which of the following hydrocarbons C_2H_6, C_3H_8, C_3H_6, C_2H_2 and CH_4 undergo addition reactions? Explain with suitable reason. (or)

What is hydrogenation of oils? What are its industrial applications? (or)

The compound C_2H_4 undergoes hydrogenation reaction in the presence of nickel catalyst. Where is this action used? (3 Marks)

Ans: C_3H_6 and C_2H_2 undergo addition reaction. Unsaturated hydrocarbons become saturated hydrocarbons by adding hydrogen in the presence of a catalyst such as palladium or nickel. This reaction is used in the hydrogenation of vegetable oils.



18. Which vegetable oils or animal fats do you use in your home for healthy cooking? Give a suitable reason. (2 marks)

Ans: Use of vegetable oils in cooking is healthy. Oils are unsaturated and liquid. Unsaturated oils are easier to digest. Because they are more active chemically.

19. Compound X is boiled with distilled H_2SO_4 at 443K to form compound Y. Y undergoes hydrogenation to give compound Z. Z burns to produce 2 molecules of CO_2 and 3 molecules of H_2O. Identify X, Y, Z with suitable reasons. Write chemical equations. (2 marks)

Ans:

$$CH_3-CH_2OH \xrightarrow[H_2SO_4]{\text{Hot concentrated}} CH_2=CH_2 + H_2O$$

$$C_2H_4 \xrightarrow[H_2]{\text{Nickel catalyst}} C_2H_6$$

$$C_2H_6 + 3O_2 \longrightarrow 2CO_2 + 3H_2O + \text{Heat and Light}$$

X=Ethanol, Y=Ethene Z=Ethane

20. Compound A is the main component of alcohol. A is oxidized to form B. B is used as a preservative in pickles. Compound B reacts with A to form the aromatic compound C. Write the equations of the chemical reactions given here and label A, B, C. (3 Marks)

Ans:

$$\underset{\text{(Ethanol)}}{CH_3CH_2OH} \xrightarrow[\text{Acidic } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} \underset{\text{(Ethanoic acid)}}{CH_3COOH}$$

Acid

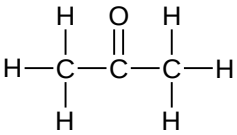
$$CH_3-COOH + CH_3-CH_2OH \longrightarrow CH_3-\underset{\underset{O}{\|}}{C}-O-CH_2-CH_3$$

A=ethanol, B=ethanoic acid C=ethyl acetate (ester)

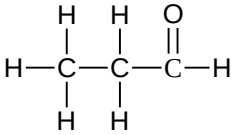
21. An organic compound with the formula C_3H_6O has two different structures. Identify the relationship between the two. Write their formulas and write their IUPAC names. (2 marks)

Ans: Different structures with the molecular formula C_3H_6O are:

Propanone



Propanal



22. Ravi used sodium salt of long chain carboxylic acids, Raju used sodium salt of sulfonic acid to clean clothes in soft water. Who among them has chosen the best method? Explain with suitable reason. (or)

When Suma washes her clothes using soap water in the well water behind her house, she notices that the dirt in the clothes does not wash off and leaves a stain. What is the reason for this? What is the correct course of action to overcome this problem? (or)

Why do micelles form when soaps are added to water? Do micelles also form in other solvents such as ethanol? (or)

Why is it necessary to rub clothes after adding soap to clean them? How do soaps remove dirt like oil grease? (3 Marks)

Ans: Soaps:

- Soap molecules are sodium or potassium salts of long chain carboxylic acids.
- The ionic end of soap reacts with water while the carbon chain reacts with oil (grease). Thus the soap molecules form structures called micelles.
- The hydrocarbon end of the soap molecules is towards the oil droplet and the ionic end is towards the outside.
- It forms an emulsion in water.
- Thus, the soap micelle helps to remove the dirt in the water and the clothes can be washed clean.

Detergents:

- When soap reacts with calcium and magnesium salts present in hard water, it creates a water-insoluble residue that cannot be cleaned and remains undissolved even after washing with water. So soap should be used in large quantities. Detergents are used as cleaners to overcome this problem.
- Usually, detergents are sodium salts of sulfonic acids or ammonium salts of chloride or bromide ions.
- Both compounds are due to a long chain of hydrocarbon. The charged ends of the compounds do not form non-hydrolysable bonds with the calcium or magnesium ions of hard water. Thus, they are effective even in hard water.
- Detergents are generally used to make shampoos and clothes cleaning products.

Question 23 can be answered by the following answer.

- Soap may be sufficient to clean clothes in soft water. Detergents are good cleaners. Ravi uses soap while Raju uses detergents.
- Detergents should be used for cleaning in mild hard water.
- Scrubbing and washing in water helps the soap micelle to dislodge the dirt in the water.
- Soap is soluble in other solvents such as ethanol. Hence no micelles are formed.

Chapter 5

Periodic Classification of Elements

1. **The elements X, Y and Z have the atomic numbers 9, 12 and 15. Examine which of these will have metallic character?**

   Ans:

   x) Atomic number 9: The electronic configuration of the element is $1s^2\ 2s^2\ 2p^5$
   Since it has more than 3 electrons in the outermost shell, it is not a metal.

   y) Atomic number 12: The electronic configuration of the element is $1s^2\ 2s^2\ 2p^6\ 3s^2$
   Since it has 2 electrons in the outermost shell, it is a metal.

   z) Atomic number 15: The electronic configuration of the element is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$
   Since it has more than 3 electrons in the outermost shell, it is not a metal.

2. **The electropositive nature of the element increases down the group and decreases across the period Electronegativity of the element decreases down the group and increases across the period. Atomic size increases down the group and decreases across the period. Metallic character increases down the group and increases across the period. On the basis of the above trends of the Periodic Table answer the following about the elements with atomic number 3 to 9.**

   a) **Name the most electro positive element among them:** Lithium
   b) **Name the most electro negative element among them:** Fluorine
   c) **Name the element with smallest atomic size:** Fluorine
   d) **Name the element which is a metalloid:** Boron
   e) **Name the element which shows maximum valency:** Carbon

3. **The three elements A, B and C with similar properties have atomic masses X, Y and Z respectively. The mass of Y is approximately equal to the average mass of X and Z. What is such an arrangement of elements called as? Give examples of such a set of elements.**

   Ans: The arrangement of these elements is known as Dobereiner triad
   Examples are 1) Li, Na, K 2) Ca, Sr, Ba 3) Cl, Br, I

4. **Two elements A and B belong to groups 1 and 2 respectively in the same period. Compare them with respect to a) the number of valence electrons b) valency c) metallic character d) size of the atoms.**

   Ans:

   a) Number of valence electrons in A = 1 and B = 2
   b) Valency of A is one while B is two
   c) Element A is more metallic as compared to B.
   d) B is smaller than A in size.

5. **Which of the given elements A, B, C, D and E with atomic number 2, 3, 7, 10 and 30 respectively belong to the same period?**

   Ans: Electronic configuration of elements

   A: $1s^2$
   B: $1s^2\ 2s^1$
   C: $1s^2\ 2s^2\ 2p^3$
   D: $1s^2\ 2s^2\ 2p^6$

E: $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2$

Elements with same maximum shell number B, C and D belong to same period.

6. The elements A, B, C, D and E have atomic number 3, 11, 17, 12 and 13 respectively. Which pair of elements belong to the same group?

Ans: A -3 : $1s^2\ 2s^1$

B -11 : $1s^2\ 2s^2\ 2p^6\ 3s^1$

C-17 : $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$

D -12 : $1s^2\ 2s^2\ 2p^6\ 3s^2$

E -13 : $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$

A and B elements belong to the same group

7. Element M has atomic number 11.

a) Write its electronic configuration.

b) State the group to which M belongs.

c) Is M a metal or a nonmetal?

d) Write the formula of its chloride.

Ans:

a) electronic configuration of the element is $1s^2\ 2s^2\ 2p^6\ 3s^1$

b) M belongs to group one.

c) Element M is a metal or non-metal

d) The formula of its chloride is MCl.

8. Compare the radii of two elements X and Y Give reasons for your answer.

a) X has 12 protons and 12 electrons

b) Y has 12 protons and 10 electrons

Ans: Y has 10 electrons, but X has 12 electrons so, the effect of nuclear charge on Y is greater than that of X, therefore the radius of Y is smaller as compared to X.

9. How does atomic size vary in a period and in a group? Give reasons for your answer.

Ans: On moving left to right in a period the atomic size decreases.

Because effective nuclear charge increases which tends to decrease the distance between the outermost shell of the atom and the nucleus.

On moving down the group the number of shells increases due to which the distance between the nucleus and outermost shell also increases, therefore the atomic size of the atoms increases.

10. How does the metallic character change across the period and group?

Ans: Metallic character decreases across the period as the effective nuclear charge acting on the valence shell electrons increases, the tendency to lose electrons will decrease.

Metallic character increases down the group as the effective nuclear charge experienced by valence electrons decreases because the outermost electrons move farther away from the nucleus. Therefore, electrons can be lost easily.

11. Which elements replaced Eka- Boron, Eka –Aluminium and Eka-Silicon? and write the chlorides of Eka-Silicon and Eka–Aluminium.

Ans: Eka-Boron : Scandium

Eka-Aluminium : Gallium

Eka-Silicon : Germanium
Eka-Silicon Chloride : GeCl4
Eka-Aluminium chloride : GaCl3

12. Write the similarities of hydrogen with alkali metals and halogens.

Ans: Similarities of hydrogen with alkali metals:

a) Electronic configuration of hydrogen resembles that of alkali metals.
b) Like alkali metals hydrogen combines with halogens, oxygen and sulphur to form compounds having similar formulae.

Similarities of hydrogen with halogens :

a) Like halogens hydrogen also exists as diatomic molecules.
b) Like halogens hydrogen combines with metals and non-metals to form covalent compounds.

13. How could the modern periodic law remove various anomalies of Mendeleev's periodic table?

Ans: a) Elements are arranged in the increasing order of their atomic number in Modern Periodic Table, thus there was no need for keeping more than one element in one slot.

b) In the Modern Periodic Table there was no problem of the place of isotopes, as isotopes have the same atomic number with different mass numbers.

14. Write the difference between Mendeleev's and modern periodic table

Mendeleev's Periodic Table	Modern Periodic Table
a) Elements are arranged in the increasing order of their atomic masses.	Elements are arranged in the increasing order of their atomic number.
b) There are 8 groups	There are 18 groups
c) Groups are sub divided into subgroups	Groups are not sub divided into subgroups
d) Group of noble gases was not present	A separate group for noble gases is present

15. Nitrogen (Z =7) and Phosphorus (Z=15) belong to same group-15 of the periodic table. Write the electronic configuration of these two elements. Which of these two is more electronegative? Why?

Ans: Electronic configuration of Nitrogen:7 = $1s^2\ 2s^2\ 2p^3$

Electronic configuration of Phosphorus:15= $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$

The element Nitrogen will be more electronegative than Phosphorus because Nitrogen is in the second period and phosphorus is in the third period. Electronegativity increases across the period and decreases down the group.

16. The table given below shows the mass number and number of neutrons in four elements P,Q,R and S

Element	**P**	**Q**	**R**	**S**
Mass number	**12**	**20**	**23**	**35**
Number of Neutrons	**6**	**10**	**12**	**18**

a) Write down the atomic numbers P, Q, R and S
b) Write down electronic configuration of P, Q, R and S.
c) To which group do P, Q, R and S belong?
d) To which period do P, Q, R and S belong?
e) Which amongst the above elements is a noble gas, an alkali metal, and a halogen?

Ans:

Element	P	Q	R	S

a)	Atomic number	P+N=12 12-6=6	P+N=20 20-10=10	P+N=23 23-12=11	P+N=35 35-18=17
b)	Electronic configuration	$1s^2\ 2s^2\ 2p^2$	$1s^2\ 2s^2\ 2p^6$	$1s^2\ 2s^2\ 2p^6\ 3s^1$	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$
c)	Group Number	14	18	1	17
d)	Period Number	2	2	3	3
e)			Noble gas	Alkali metal	Halogen

DO YOU KNOW HOW TO KNOW THE PERIOD AND GROUP NUMBER OF ELEMENTS

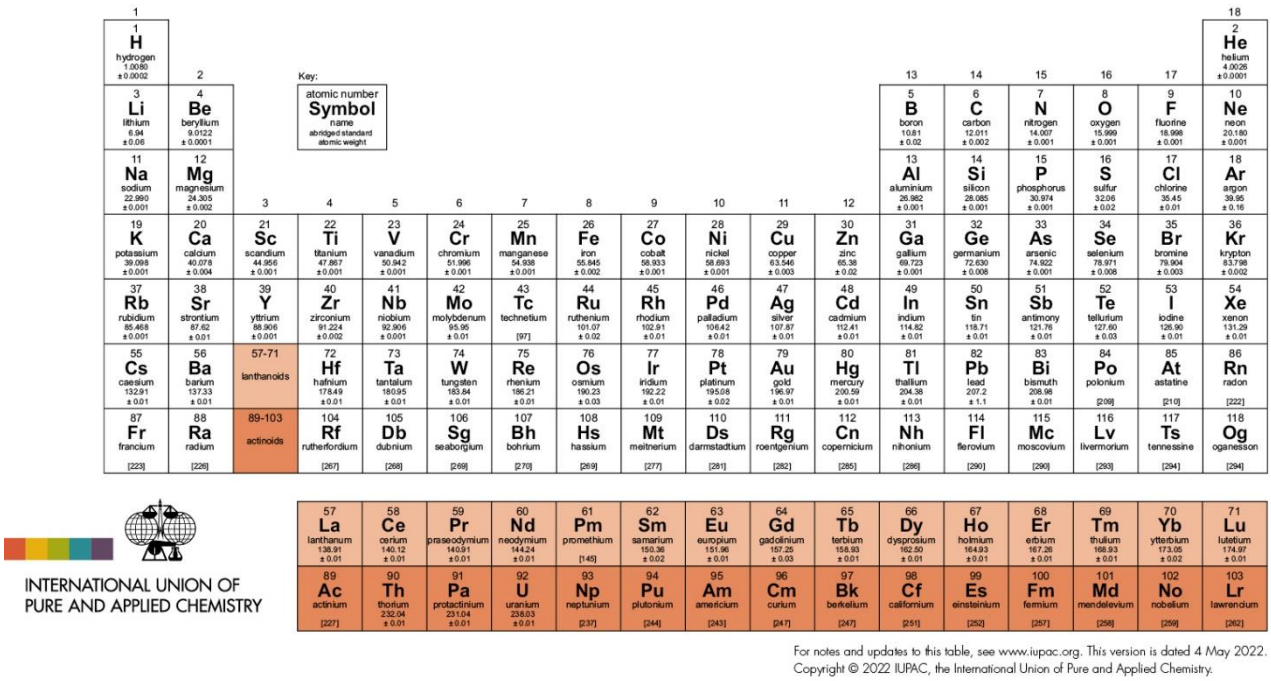
PERIOD NUMBER OF ELEMENTS:

- The period number of the element is equal to the maximum shell number.

GROUP NUMBER OF ELEMENTS

- If the element is in s block, then the group number is equal to the number of valence electrons
- If the element is in the p block, then the number of the group can be determined by the formula: (number of valence electrons + 10)
- If the element is in the d block then the number of the group can be determined by the formula: number of electrons in (n-1)d sub shell + number of electrons in (n)s sub shell

IUPAC Periodic Table of the Elements



Life Processes

1. **What are the differences between unicellular and multicellular organisms about exchange of matter with their surroundings. (or)**
   Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans.
   Ans: In unicellular organisms the entire body is in contact with their surroundings, and also their energy requirements are less, so the intake of food, exchange of gases and excretion of waste materials occur through diffusion. But in multicellular organisms the size of the body is much bigger and also their energy requirement is more, so they have to perform many complex life processes, so diffusion is insufficient to them.

2. **What are the differences between autotrophs and heterotrophs?**

Autotrophs	Heterotrophs
They derive their simple food particles in form of carbon di oxide and water from inorganic sources.	They depend upon autotrophs for their energy supply.

3. **How can you say that light is essential for photosynthesis? (or)**
   List the process that occur during photosynthesis? (or)
   What is the role of chlorophyll in photosynthesis?
   Ans:
   - Absorption of light energy from chlorophyll.
   - Conversion of light energy to chemical energy and breakdown of water molecules into hydrogen and hydroxyl ions.
   - Carbon di oxide gets converted to carbohydrates.

   Like this the carbon dioxide and water absorbed by plants get converted into carbohydrate in presence of sunlight and chlorophyll. So, both sunlight and chlorophyll are essential for photosynthesis.

4. **What is the function of stomata in plants? (or)**
   How can you say stomata plays a very important role in the development of plants?
   Ans: Stomata plays a very important role in the exchange of gases during photosynthesis. By also taking part in transpiration, they help in the absorption of water and minerals from the soil. Like this stoma help in the growth of plants.

5. **How do plants get the raw materials required for their body building?**
   - Plants absorb the water required for photosynthesis from soil through roots.
   - They absorb carbon dioxide required for photosynthesis from the atmosphere through stomata.
   - They absorb sunlight through chlorophyll.
   - They get nitrogen, phosphorus, iron, magnesium, and other materials through soil.

6. **What is the importance of transpiration in plants? (or) What is the role of transpiration in healthy growth of plants?**
   Ans: Through transpiration plants release excess water from their body to the atmosphere. This creates suction in their body by which roots absorb water and nutrients from the soil and transport it to leaves through xylem for photosynthesis. Along with this transpiration also helps the plants to keep their body cool. Like this transpiration plays an important role in the healthy growth of plants.

7. **Why is the small intestine of herbivores longer than that of carnivores?**
   Ans: The small intestine is longer in herbivores to digest the cellulose which takes long time for digestion. But since meat is comparatively easier to digest the small intestine of carnivores is shorter.

8. **Explain the process of nutrition in Amoeba**.
Ans: Amoeba catches its prey using pseudopodia. First in encircles the food through pseudopodia and engulf it inside the cell. In the cell the food enters the vacuole which digest the food from complex to simple form. Then they diffuse into cytoplasm. The undigested food is then excreted out of the cell.

9. **How can you say that the mouth plays an important role in the process of digestion in human beings? (or)**
Explain the process that occurs in the mouth during digestive process.
Ans:
   - The teeth soften the complex food molecules to simpler forms.
   - The tongue helps to sense the taste and it also provides food to teeth for digestion.
   - The salivary amylase present in saliva converts starch into sugar.

10. **What is the role of digestive enzymes? (or)**
What is the importance of chemical digestion in humans?
Ans: Digestive enzymes break down the complex food molecules to simpler forms and help the body cells to easily absorb the nutrients and use them for various metabolic activities.
   - Amylase: It converts starch to sucrose.
   - Pepsin: It breaks down proteins to peptides or amino acids.
   - Lipase: It breaks down lipids into glycerol or simple fatty acids.
   - Trypsin: It digests the proteins.
   - Lactase: It converts lactose into simple sugar and glucose.
   - Sucrose: it divides sucrose to fructose and glucose.

11. **Explain the digestive process that takes place in the small intestine of human beings. (or)**
What is the role of the small intestine in the digestive system of human beings?
Ans:
   - The inner wall of the small intestine has secretary glands which secrete the intestinal juices. The enzymes present in these juices help digest protein to amino acids, complex carbohydrates to glucose and fats to fatty acids and glycerol.
   - The inner walls of small intestine possess finger like projections called villi which increases the surface area for absorbing the nutrients from the food.

12. **What are the different methods by which glucose is oxidized in different animals? (or)**
What are the differences between anaerobic and aerobic respiration?

Anaerobic respiration	Aerobic respiration
○ It takes place in the absence of oxygen. ○ Incomplete oxidation of glucose takes place ○ Carbon di oxide and ethanol are the end products. ○ Less energy is produced	○ It takes place in the presence of oxygen. ○ Complete oxidation of glucose takes place. ○ Carbon di oxide and water are the end products. ○ More energy is produced.

13. **Why is the rate of respiration in aquatic organisms faster than terrestrial organisms. (or)**
What advantages over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?
Ans: Aquatic organisms utilize the oxygen dissolved in water. Since the solubility of oxygen in water is less there is not much oxygen available for aquatic organisms and so, they have to breathe at a faster rate.
On the other hand, terrestrial animals take oxygen directly from the atmosphere where it is in free form, so their rate of breathing is comparatively less.

14. **What is the role of hydrochloric acid in our stomach? (or) What do Hydrochloric acid in our stomach produced for?**

Ans:

- It provides an acidic medium which activates enzyme pepsin for its action.
- It kills various microbes present in food.

15. Why does the muscle cramp occur? (or)
What happens when our cells don't get sufficient amount of oxygen?
Ans: Sometimes when our muscular cells won't get sufficient quantity of oxygen pyruvate gets converted into lactic acid. By this sudden activity the lactic acid produced in our cells results in muscle cramps.

16. Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?
Ans: The tissue with high metabolic rate in birds and mammals require rapid delivery of oxygenated nutrient rich blood. This is supported by high blood pressure. This high blood pressure is maintained by double circulation i.e., separation of oxygenated and deoxygenated blood in birds and mammals.

17. What are the components of the transport system in human beings and what are their roles?

- Heart: Heart receives deoxygenated blood from different parts of the body and sends it to lungs. Then it receives oxygenated blood from lungs and sends it to different parts of the body.
- Blood: It supplies all the necessary nutrients to all cells of the body.
- Blood vessels: a) Veins: They carry deoxygenated and oxygenated blood from different parts of the body to heart.
  b) Arteries: They carry deoxygenated and oxygenated blood from heart to different parts of the body.
- Lymph: Carries digested and absorbed fat from the intestine and drains excess fluid from extracellular space back into the blood.

18. What are the roles of xylem and Phloem in plants? (or) How does the transport of water and food take place in plants? (or)
What are the components of a transport system in highly organized plants?

Xylem	Phloem
Xylem transports the water and minerals absorbed from the roots to leaves.	Phloem transports the food produced in leaves to different parts of the body.

19. How is the amount of urine produced in our body regulated? (or) Why do we urinate more in winter than in summer days?
Ans: The amount of urine produced is controlled by an anti-diuretic hormone (ADH) produced by the anterior pituitary gland. If excess water is present in the blood, then a more dilute urine is excreted. i.e., less water is reabsorbed and more of it is excreted out. In case of less water content in blood, concentrated urine is excreted.

In cold season since our body retains less amount of water and expels the rest, we urinate more but in summer our body retains more water and expels less so we urinate less.

20. How do you say that plants also excrete waste from their body? (or)
What are the mechanisms used by plants to excrete waste from their body?
Ans:

- The solid waste produced in plants is expelled by dry leaves, dry flowers etc.
- Plants release excess water from their body by the process of transpiration through stomata.
- The product of photosynthesis oxygen and the waste product of respiration carbon dioxide is released into the atmosphere through stomata.
- Plants also excrete some waste in their surrounding soil.

Chapter 7 Control and Coordination

1. **A person named Sujith has a swollen neck and is gaining weight irregularly. Name the problem facing. Write your suggestions for him. (2 Marks)**
   Ans: Sujith is deficient in thyroxine secreted by thyroid gland
   Suggestion: Consumption of iodized salt and food can control this problem.

2. **Salivation in the mouth immediately after seeing food and closing your eyes immediately when a bright light falls on your eyes. Give a scientific reason for the above events. (1 Marks)**
   Ans: It is a reflex action of the brain

3. **If the left hemisphere of the cerebrum is affected, the right side of the body will be paralyzed. If the right hemisphere of the cerebrum is affected, why does the left side of the body suffer from paralyzing? (2 Marks)**
   Ans: The nerves coming from the left side of the body are connected to the right hemisphere of the cerebrum and the nerves coming from the right side of the body are crossed in the neck and connected to the left hemisphere of the cerebrum. So, if the left hemisphere of the cerebrum is hit, the organs on the right side of the body will be affected by lateral air and if the right hemisphere of the cerebrum is hit, the organs on the left side of the body will be affected by paralysis.

4. **What happens if the thyroxine hormone is overproduced? (2 Marks)**
   Ans:
   - Excessive production of thyroxine increases metabolic rate
   - Protrusion of the eyeball
   - Increase in blood pressure
   - Sweating, fatigue
   - Nervous tension causes problems like weight loss.

5. **Why are some diabetic patients treated with insulin injections? (2 Marks)**
   Ans: If less than the required amount of insulin is produced, the amount of glucose in the blood increases and is excreted through the urine which leads to diabetes or sugar disease.
   Insulin injections are given to control the level of glucose in the blood and control diabetes or sugar disease.

6. **Why do some people who consume alcohol have unsteady gait? (2 Marks)**
   Ans: Alcohol affects the cerebellum, which is responsible for body balance and muscle movement, so their gait is unsteady.

7. **Why is it that when the leaves of the touch me not plant are touched, they begin to fold and eventually close? (2 Marks)**
   Ans: The plant cells of touch me not plant change their shape by changing the amount of water inside them. As a result, they change their shape by bulging or crumpling.

8. **How does chemical adaptation take place in animals? (1 Marks)**
   Ans: Chemical adaptation takes place in animals by the production of hormones.

9. **Which signals are interrupted when the spinal cord is injured? (1 Marks)**
   Ans: Transmission of reflex and involuntary signals is interrupted when injured.

10. **What is the need for coordination and control system in an organism? (2 Marks)**
   Ans: Multicellular organisms, especially animals, are more active. Each organ of the body performs a specific function. The functional activity of all these organs requires cooperation and control

11. **How do we detect the smell of an incense stick? (2 Marks)**
   Ans: When the smell of incense stick comes in contact with the nose, it dissolves in the mucus-like substance in the nose and there are odor receptors in the olfactory nerve which is the sensory nerve in the upper walls of the nasal cavity. When these reach the olfactory region of the cerebrum, we become aware of smell.

12. **A person's face is pale and his breathing rate is increased due to fear. Analyze the process by which a person prepares to face this situation. (2 Marks)**
   Ans: Adrenaline is secreted directly into the blood. Blood is reduced to the skin by a configuration of muscles around small arteries in the skin.
   The respiratory rate increases in the contractions of rib muscles and lungs. A faster heart rate often means more oxygen is supplied to the muscles.

13. **Why is the use of iodized salt recommended? (2 Marks)**
   Ans: Iodine is required for the synthesis of thyroxine.
   - Carbohydrates provide the best balance for growth of protein and fat metabolism in our body.
   - If there is lack of iodine in our diet, we are prone to gout and hence use of iodized salt is recommended.

14. **How is the movement of the leaves of the touch me not plant different from the movement of the stem towards the light? (3 Marks)**
   Ans: If touched, the touch me not plant moves its leaves in response to the touch. The cells of this plant change their shape by changing the amount of water inside them. As a result, they change their shape by bulging or crumpling. This type of movement is not dependent on growth. If the young stems of the plant respond by bending towards light, this type of movement is directed and growth dependent.

15. **How does chemical coordination take place in animals? (1 Marks)**
   Ans: Chemical coordination is done by hormones, which are secreted by special glands called endocrine glands.

16. **Where is the connection of the reflex arc made? (1 Marks)**
   Ans: The best place can be said to be the first point of confluence of the reflex arc between the cognitive and afferent nerves.

17. **Humans are creatures with thinking power, how does this think power work in them? (3 Marks)**
   Ans: Human spinal cord is made up of nerves that supply information for thinking. The thought process involves highly complex mechanistic and neural arrangements. All these are concentrated in the brain which is the main coordination center of the body. The brain and the spinal cord together form the central nervous system. The peripheral nervous system facilitates communication between the central nervous system and other parts of the body so that the brain helps us think and act based on thought.

Chapter 8

How do Organisms Reproduce?

1. Variation is beneficial to a species. But not for an organism. Why?

Ans: In many situations, the effects of changes in the environment make it difficult for organisms to survive. Then DNA replication during reproduction causes many variations.

The resulting differences adapt to the changed environment and lead to the survival of a species. And is the basis of life.

2. Do organisms create exact replicas of themselves? Explain.

Ans: Chromosomes in the nucleus of a cell contain information in the form of DNA (deoxy ribonucleic acid) molecules for the next generation to inherit traits.

DNA in the cell nucleus is the source of information for synthesizing proteins.

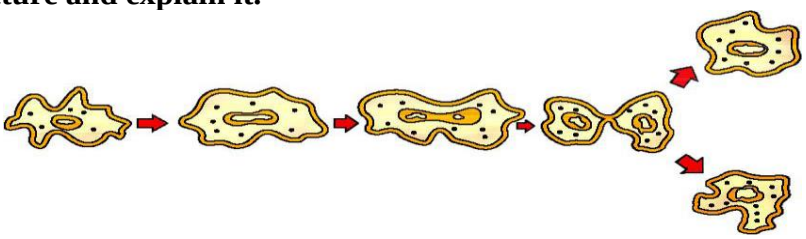
If, however, the information changes, different proteins are synthesized and eventually lead to altered body structures.

3. State the methods of reproduction used by single organisms

Ans:

Sl. No	Reproduction type	Organism name
1	Binary fission	Leishmania, Amoeba
2	Fragmentation	Spirogyra
3	Regeneration	Planaria
4	Budding	Yeast
5	Spore formation	Rhizopus

4. See the picture and explain it.



Ans:

- Amoeba cell divides into two equal parts.
- Cytoplasm and cell organelles are distributed equally.
- The cell wall divides into two halves to give rise to two daughter cells.
- Cell division in amoeba can occur on any plane.

5. Below is a picture of the reproduction process in Plasmodium. Observe the picture and answer the given questions.

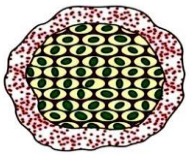


Diagram of reproduction process of Plasmodium

a) Name and define the type of reproductive process that takes place in Plasmodium.

Ans: multiple fission

In unicellular organisms such as plasmodium, the process of cell division to produce many daughter cells at once is called multiple fission.

b) What is asexual reproduction?

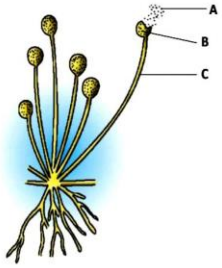
Ans: Reproduction in which an organism produces offspring without the production of gametes is called asexual reproduction.

6. **How does binary fission differ in Amoeba and Leishmania? Explain.**
Ans: Amoeba does not have a specific shape. Therefore, in amoeba, binary fission can occur in any plane.
Leishmania has a whip-like structure at one end of its body. So, binary fission occurs in a certain plane according to physical structure.

7. **If a planaria or hydra were to be cut apart for some reason, how would those pieces be able to grow into separate organisms? Justify.**
Ans:
   - In organisms such as planaria or hydra, if the body is cut for some reason, specialized cells in those organisms carry out regeneration.
   - Differentiated cells multiply, giving rise to more cells.
   - Differentiated cells from a group of specialized cells undergo changes to become organs. The severed part grows into a separate organism.
   - These changes take place in an organized sequence. This is called development.

8. **Bryophyllum plant leaves produce new plants if they fall to the ground. But this will not happen with leaves of rose plants. Why?**
Ans: Buds are produced in the cavities along the margin of a bryophyllum leaf that has fallen on the soil and grows into new plants.
When the leaves of rose plants fall on the soil, buds are not produced and therefore do not grow into new plants.

9. **Name the creature in the picture given below. Name the parts a, b and c in the figure and explain their structure and functions.**
Ans: Rhizopus (Bread mold)



<u>a. formation of spores</u>
   - Spores are thick walled.
   - Come in contact with any moist surface
   - A thick wall protects the spores until they begin to grow.
   - Spores develop into new rhizopus organisms.

<u>b. The structure of the sporangium:</u>
   - The reproductive organs found in Rhizopus are small round structures called sporangia.
   - Spores contain spores. Spores develop into new rhizopus organisms.

<u>c. Formation of hyphae (oothithichie).</u>
   - Hyphae are thread-like structures found in Rhizopus.
   - Small round structures at the tip of hyphae contain spores.

10. **Which of sexual reproduction and asexual reproduction is more conducive to the survival of species? State your conclusion.**
Ans: A type of sexual reproduction is more conducive to the survival of an organism species.
   - DNA replication is not completely accurate and changes that occur during DNA replication led to differences in organisms.
   - During sexual reproduction, the number of chromosomes and the amount of DNA are halved as a result of meiosis cell division in the gametes.
   - Gametes of two organisms combine to form a new organism.
   - This results in a rearrangement in the number of chromosomes and the amount of DNA in the new generation. Then differences arise.

11. **In sexual reproduction, the amount of DNA remains constant even though DNA replication of two different organisms occurs. How?**
Ans:
   - During sexual reproduction, when the gametes are formed in meiosis, cell division halves the number of chromosomes and the amount of DNA.
   - Gametes of two organisms combine to form a new organism.
   - When male and female gametes combine to form a new generation of organisms, there is a

rearrangement in the number of chromosomes and the amount of DNA.

- Hence, the chromosome number is the same in the lyginka reproductive parent and offspring.

12. How does fertilization occur in plants? Name the parts that develop into seeds and fruits.

Ans:

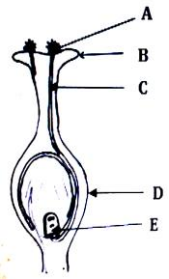
- After the pollen grains reach the stigma, a tube grows from the anther and travels along the anther to reach the ovary.
- Pollen reaches the female gametes in the ovary.
- Fertilisation of male gamete and a female gamete form a zygote
- Inside the ovum, the zygote divides many times to form an embryo.
- The ovule develops a rough coat and slowly transforms into a seed.
- Ovary grows rapidly and ripens

13. Can fertilization occur in flowers without pollination? Justify your answer.

Ans:

- If there is no pollination, there is no fertilization in flowers.
- Pollination is the transfer of pollen grains from the stamen to the stigma.
- Fertilization cannot occur without the pollen grains moving into the ovary and the ovules in the ovule.
- Therefore, fertilization is not possible without pollination.

14. Name the picture given below? State the parts a, b, c, d and e marked in the figure and their function.



Ans: Germination of pollen on stigma.

A. Pollen grain: Pollen grains are male gametes. Involved in sexual reproduction.
B. Stigma: It is the tip of the pistil and has a sticky substance to stick to pollen grains.
C. Pollen tube: The pollen tube is a long tube between the stigma and the ovary. It transports the pollen grains to the ovary and helps in fertilization
D. Ovary: The ovary is the female reproductive organ. Ovaries produce eggs.
E. Ovum/female gamete: The ovum is the female gamete, which fuses with the male gamete to form a zygote.

15. Name the parts that produce the future shoot and future root in a seed that sprouts.

Ans:

- The future shoot is the Plumule
- The future root is the first radicle.

16. State the function of cotyledons.

Ans: Function of cotyledon: The cotyledon stores the food necessary for the growth of the embryo.

17. Mention the functions of testicle, seminal vesicle and prostate gland of male reproductive system.

Ans:

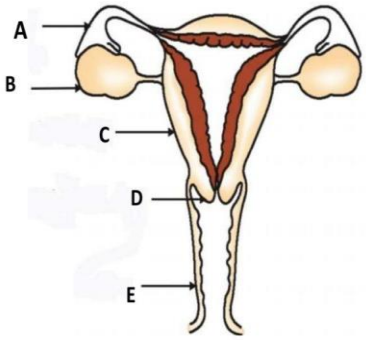
- Testicle: The testosterone hormone is secreted, and testosterone causes the physical changes seen during puberty in boys. Produces gametes or sperm.
- Seminal vesicle: Helps in sperm movement. The vas deferens is connected to the duct leading from the bladder. So, the urethra is the common route of movement of sperm and urine.
- Prostate gland: It secretes into the vas deferens. The secretion facilitates the transport of sperms and provides nourishment to them.

18. In the management of an individual's reproductive fertility what is the role location of testicles in the body:

Ans: A lower temperature than body temperature is required for sperm production. So, the testicles are outside the abdomen in the scrotum.

19. Observe the given picture. Name the structure of reproductive system? Name the parts A, B, C, D and E marked in the figure and explain their function.

Ans: Female reproductive system



A. Fallopian tube or Oviduct:
   - Transports the ovum produced in the ovary to the uterus.
   - Fertilization takes place in the fallopian tube itself when the egg and sperm come together.

B. Ovary
   - Releases ovum (female gametes).
   - Secretes female hormones. (Estrogen and Progesterone)

C. Uterus:
   a. The embryo attaches itself to the inner lining of the uterus.
   b. Contributes to fetal growth and nutrition.

D. Cervix:
   a. The uterus opens into the vagina through the cervix.
   b. It is the path that sperms travel through to reach the egg.

E. Vagina:
   a. During sexual intercourse, sperm enter the uterus through the vaginal canal.
   b. Menstrual secretions are excreted through the vagina.

20. What changes take place in the uterus for fetal development?

Ans:
- Male and female gametes are fertilized to form a zygote.
- A zygote undergoes many divisions to form an embryo.
- The fetus continues to develop antibodies in the uterine lining.
- The lining of the uterus thickens and has an adequate blood supply to nourish the growing fetus.

21. Among women

A. What is sexual maturity?
B. How does menstruation occur?
C. What is the role of placenta in pregnancy?

Ans:

A. Sexual maturity includes gamete (ovum) production, sexual attraction, and physical changes.

B. Menstruation:
   - If the egg is not fertilized, then there is no need for uterine lining.
   - The lining of the uterus slowly cracks and comes out of the vagina in the form of blood and mucus. This is called menstruation.
   - The menstrual cycle occurs every month and usually lasts for two to eight days.

C. Role of placenta in pregnancy
   - Placenta is a special organ plate-like structure embedded in the wall of the mother's uterus during pregnancy.
   - Provides glucose and oxygen from the mother to the fetus.
   - Excretes the waste produced by the fetus.

22. Population control is necessary for progress and economic development of the country. What are the methods of contraception responsible for population control? Explain.

Ans: A method of contraception that mechanically prevents the sperm from reaching the ovum is called contraception.
- Condom use: It is the act of wearing a condom over the penis or inserting a bag into the vagina.
- Use of contraceptive pills: Use of birth control pills alters the balance of hormones in the body. As a result, the egg is not released, and fertilization does not take place. Prevents pregnancy. (The use of birth control pills can also cause side effects by altering the balance of hormones.)
- Use of Copper-T: Blocking fallopian tube. (May cause side effect due to uterine irritation.)
- Surgical methods: Tubectomy for women and vasectomy for men can prevent pregnancy. (The surgical procedure itself can lead to infection and other problems if not performed properly to ensure long-term safety.)

Chapter 9

Heredity and Evolution

1. **No two individuals are absolutely alike in population. Why? 1mark**
   Ans: No two individuals are absolutely alike in population because variation arises due to DNA copying

2. **How does comparing the DNA of different species help in evolutionary studies? 1mark**
   Ans: Comparing the DNA of different species gives a direct estimate of how much the DNA has changed during the formation of these species. Thus, it helps us to great extent in tracing the evolutionary pathways.

3. **How do genes control traits? 1mark**
   Ans: Genes carry information for producing proteins, which in turn control the various body characteristics

4. **When a black guinea pig is crossed with a white guinea pig, what coloured guinea pigs are obtained in F1 if black colour is dominant over white? 1mark**
   Ans: Black

5. **In a cross between a tall pea plant (TT) and a short pea plant (tt), what will be the characteristics shown by the F1 generation? 1mark**
   Ans: All the plants would be tall plants (Tt).

6. **If the weight of an elephant is reduced because of starvation, the progeny elephants will not have low weight. Give reason. 1mark**
   Ans: This is because the decrease in weight will not cause a change in the DNA of germ cells, due to which this change cannot be inherited.

7. **In a cross between round yellow seeds (RRYY) and wrinkled green seeds (rryy) of pea plants, what is the ratio of plants obtained in F_2 generation? 1mark**
   Ans: 9 round yellow : 3 round green : 3 wrinkled yellow : 1 wrinkled green.

8. **In turtle, high incubation temperature leads to the development of female offspring. On the other hand, in lizards, high incubation temperature leads to the development of male offspring. What determines the sex of the offspring in these examples**? **1mark**
   Ans: In these examples, the temperature at which the fertilized eggs are incubated determines whether the offspring will be a male or a female.

9. **Where are the genes located? What is the chemical nature of genes? 2mark**
   Ans: Genes are located on chromosomes in linear sequence and at fixed positions. Chemically, genes are made up of nucleic acids which constitute DNA.

10. **Why will each gamete contain only one gene set? 2mark**
    Ans: The genes controlling a particular trait separate from each other during gamete formation. Hence gamete is always pure as far as contrasting characteristics are considered and will possess only one gene set.

11. **Organisms showing asexual reproduction show very little variation from each other. Give reason? 2mark**
    Ans: In asexually reproducing organisms, there is no mixing of genes of two different individuals since only one partner is involved. There are very minor variations generated in such organisms due to small inaccuracies in DNA copying.

12. **"The chromosome number of the sexually reproducing parents and their offspring is the same". Justify this statement. 2mark**
    Ans: Male individual have 46 chromosomes but because the gametes are always haploid I.e., they have half the number of chromosomes: sperms will be haploid (23 chromosomes). Female individual also contains only 23 chromosomes in egg. It is the fusion of the sperm and egg which leads to an offsprings with 46 chromosomes.

13. **During crossing, why do new features which are not present in the parents appear in the offsprings? 2mark**

Ans: In crossing, if two or more traits are involved, their genes assort independently, irrespective of the combinations present in the parents. So, new combinations of genes appear in the offsprings leading to new traits.

14. **Why cannot the experiences of an individual during its lifetime be passed on to its progeny? 2mark**

Ans: The experiences of an individual may only affect the somatic cells but will not change the DNA of the germ cells. Change in non-reproductive tissues cannot be passed on to the DNA of the germ cells. Therefore, the experiences of an individual during its lifetime can not be passed on to its Progeny.

15. **What are chromosomes? Explain how in sexually reproducing organisms the number of chromosomes in the progeny is maintained. 3mark**

Ans: Chromosomes are long thread like structures which contain hereditary information of the individual and are thereby the carriers of genes. Male individuals have 46 chromosomes but because the gametes are always haploid, i.e., they have half the number of chromosomes; sperms will be haploid (23 chromosomes). Female individual also contains 23 chromosomes in egg. It is the fusion of the sperm and egg which leads to an offspring with 46 chromosomes.

16. **"We cannot pass on to our progeny the experiences and qualifications earned during our lifetime." Justify the statement giving reason and examples. 3mark**

Ans: The experiences and qualifications that a person earns during his/her lifetime are examples of acquired traits. These traits cannot be inherited. For example, a wrestler develops large muscles because of his training program; it does not mean that his offspring will necessarily have large muscles. These characters do not affect the DNA make-up of germ cells of an organism; thus, they are not passed on to the next generation.

On the other hand, inherited traits are the traits that are transferred from the parents to their offspring. Inherited traits are coded by genes present in the DNA of gamete cells from where they are transferred to the progeny. Examples of inherited traits are skin colour and eye colour.

17. **"It is possible that a trait is inherited but may not be expressed." Give a suitable example to justify this statement.**

Or

With the help of an example justify the following statement: "A trait may be inherited but may not be expressed". 3mark

Ans: Yes, it is possible that a trait is inherited but may not be expressed.

For example, when pure tall pea plants are crossed with pure dwarf pea plants, only tall pea plants are obtained in F_1 generation.

On selfing tall plants of F_1, both tall and dwarf plants are obtained in F_2 generation in the ratio 3:1. Reappearance of the dwarf character, a recessive trait in F_2 generation shows that the dwarf trait was present in individuals of F_1, but it did not express.

18. **What is DNA copying (Replication of DNA)? State its importance. 3mark**

Ans: A process where a DNA molecule produces two similar copies of itself in a reproducing cell is called DNA copying.

Its importance are:

- It makes the transmission of characters from parents to the next generation possible.
- It causes variation in the population.

19. **It is possible that a trait is inherited but may not be expressed. Give a suitable example to justify this statement. 3mark**

Ans: Yes, it is possible that a trait is inherited but may not be expressed. For example, when pure tall pea plants are crossed with pure dwarf pea plants only tall pea plants are obtained in F_1 generation. On selfing tall plants of F_1 both tall and dwarf plants are obtained in F_2 generation in the ratio 3 : 1. Reappearance of the dwarf character a recessive trait in F_2 generation shows that the dwarf trait was present in individuals of F_1 but it did not express.

20. It is a matter of chance whether a couple will have a male or a female child. Justify this statement by drawing a flow chart. 3mark

Sex of the child is determined at time of fertilization when male and female gametes fuse to form zygote. The females have a pair of XX chromosomes and produce gametes with equal number of chromosomes. Whereas males have a pair if XY chromosomes so half of gametes possess X chromosome and half have Y chromosome. But when a sperm carrying X chromo-some, child born will be a girl. However, if a sperm carrying Y chromosome, fertilizes an ovum which carries X chromosome, then fertilizes an ovum which carries X chromosome, the child born will be a boy. So, sperm determines the sex of the child.

21. In human beings, the statistical probability of getting either a male or female child is 50 : 50. Give a suitable explanation. 3mark

Ans: The sex of an infant is determined by the type of sex chromosome contributed by the male gamete. A male produces two types of sperms-one type bears 22 + X composition and the other, 22 + Y, Therefore, a male have 50% sperms with X-chromosomes and other 50% with Y-chromosome.

Any one of the two types of sperms can fertilize the egg. If a Y-bearing sperm fertilizes the egg, the zygote will be XY (male) and when an X-bearing sperm fertilizes the egg, the resulting zygote will be XX (female). Since the ratio of X-chromosome and Y-chromosome in male gamete is 50 : 50. The statistical probability of male or a female infant is also 50: 50.

22. Define genetics.

(i) Who is regarded as the 'Father of Genetics'? Name the plant on which he performed his experiment.

(ii) Why did he select that specific plant for his experiments? 3mark

Ans:

(i) Genetics is a branch of biology that deals with the heredity and variation of organisms.
Gregor Johann Mendel, garden pea.

(ii) Garden pea plants were easily available / they grow in one season/fertilization was easy.

23. (i) Name the unit of inheritance. What is its function? 3mark

(ii) How are inherited traits different from acquired traits? Give an example.

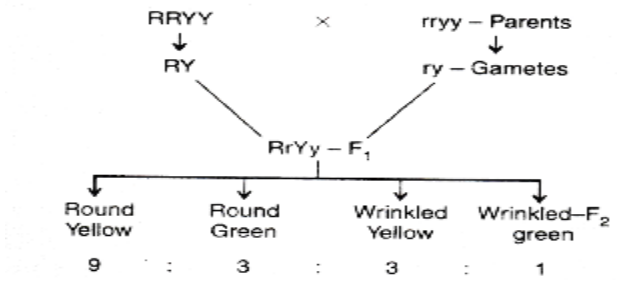
Ans:

(i) Gene. It is the carrier of genetic information from one generation to another.

(ii) The traits that are obtained from parents are inherited traits. Example: Fused and free ear lobes.
The traits that develop during lifetime of an individual are acquired traits. Example: Muscular body of a wrestler.

24. Show inheritance of two characters over two generations by making a cross between round and yellow seeded plant (RRYY) with wrinkled green seeded plant (rryy). 3mark

Ans:



25. In a mono hybrid cross between tall pea plants TT and short pea plants tt a scientist obtained only tall pea plants Tt in the F1 generation. However, on selfing the F1 generation pea plants he obtained both tall and short plants in F2 generation. Based on the above observations with other angiosperms also can the scientist arrive at a law. If yes explain the law. If not give justification for your answer. 3mark

Ans: Yes, the scientist may arrive at the law of dominance according to which the trait that is expressed in the F1 generation is the dominant trait although both the dominant and recessive traits are present in the F1 generation. In the F2 generation the recessive traits are also expressed along with the dominant

traits.

26. List three distinguishing features, in tabular form, between acquired traits and the inherited traits **3mark**

Or

Difference between Acquired trait and Inherited trait **3mark**

Ans:

Acquired trait	Inherited trait
(i) A trait of an organism which is not inherited but develops in response to the environment is called an acquired trait.	(i) A trait of an organism which is caused by a change in its genes (or DNA) is called an inherited trait.
(ii) The acquired trait of an organism cannot be passed on to its future generations.	(ii) The inherited traits of an organism are passed on to its future generations.
(iii) Acquired traits cannot direct evolution. Example, "low weight" of beetle, "cut tail" of a mouse.	(iii) Inherited traits can direct evolution. Example, "red colour" of beetles, "fur coat" of guinea pigs.

27. 'Different species use different strategies to determine sex of a newborn individual. It can be environmental cues or genetically determined'. Explain the statement by giving examples for each strategy. **3mark**

Ans: Environmental cue:

In some animals, the temperature at which fertilised eggs are kept determines whether the developing animal in egg is male or female.

In some animals like snail, individual can change sex.

Genetical cue:

A child who inherits an X chromosome from the father will be a girl and one who inherits a Y chromosome from the father will be a boy.

28. A blue colour flower plant denoted by BB is crossbred with a white colour flower plant denoted by ww. **3mark**

(i) State the colour of flower we would expect in their F1 progeny.

(ii) Write the percentage of plants bearing white flowers in F2 generation when the flowers of F1 plants were selfed.

(iii) State the expected ratio of the genotype BB : Ba : ww in the F2 progeny.

Ans:

(i) F1 generation yields only blue flowering plants. Bw.

(ii) On self-breeding the F1 generation plants both blue flowered and white flowered plants appeared in the ratio of 3: 1. It shows that the factors or traits for blue flower are dominant over the traits for white flower.

(iii) Genotypes in F2 progeny is 1 : 2 : 1

29. The genotype of green stemmed tomato plants is denoted by GG and that of purple-stemmed tomato plants as gg. When these two plants are crossed: **3mark**

(a) What color of stem would be expected in their F_1 progeny?

(b) Give the percentage of purple-stemmed plants if F_1 plants are self-pollinated.

(c) In what ratio would you find the genotype GG and gg in the F_2 progeny?

Ans:

(a) When the two plants were crossed in a monohybrid cross, it resulted in the formation of F_1 progeny that was green coloured and the genotype is heterozygous dominant (Gg).

(b) When F_1 plants are self-pollinated, then out of four plants, three plants are green stemmed (75%) whereas, one plant is purple stemmed (25%).

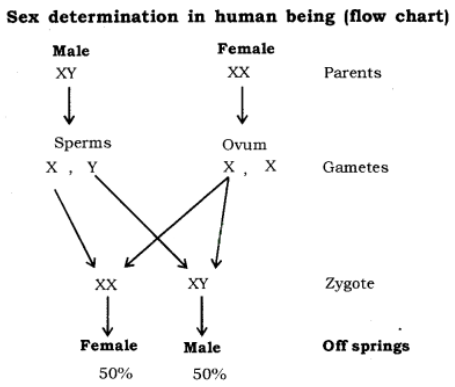
(c) In the F_2 progeny, GG (Homozygous dominant, Gg (heterozygous dominant), and gg (homozygous recessive) were present in a ratio of 1:2:1. Ratio of GG and gg is 1:1.

30. Explain with the help of a figure that father is responsible for the sex of a child. **3mark**

Ans: Sex of a child depends on what happens during fertilization.

(i) If a sperm carrying X chromosomes fertilizes an ovum which carries X chromosome, then the child born will be a girl.

(ii) If a sperm carrying the Y chromosome fertilizes an ovum which carries X-chromosome, then the child born will be boy. Thus, sperm (from father) determines the sex of the child.



31. With the help of suitable examples, explain why certain traits cannot be passed on to the next generation. What are such traits called? 3mark

Ans: The traits which are acquired during the lifetime of a person are called acquired traits. These traits involve changes in non-reproductive cells (somatic cells) which are not transferred to germ cells. So, these traits cannot be passed on to the next generation. For example, learning skills like swimming, dancing, cooking, body building, etc. are acquired traits and cannot be passed on to the next generation.

32. (a) How do Mendel's experiments show that traits may be dominant or recessive?
(b) How do Mendel's experiments show that traits are inherited independently? 4mark

Ans: (a) Mendel conducted the experiments using or pea plant. He selected homozygous tall (TT) and dwarf (tt) pea plants. He crossed the tall pea plant with the dwarf pea plant. It was observed that the F_1 generation are all tall plants. Thus, it was concluded that the gene causing tallness is dominant while the gene causing dwarfness is recessive.

The trait expressing itself in the hybrid is the dominant one. This experiment proves Mendel's first law of inheritance. It states that when a pair of contrasting factors is brought in a hybrid, one factor inhibits the appearance of the other, one which inhibits is the dominant one and which is inhibited is recessive.

(b) Mendel performed experiments in which he took a tall plant with round seeds and a short plant with wrinkled seeds. In F_1, they were all tall and had round seeds. Tallness and round seeds were thus dominant traits. When he used these F_1 progeny to generate F_2 progeny by self-pollination, he found that some F_2 progeny were tall plants with round seeds, and some were short plants with wrinkled seeds. At the same time, there were tall plants, but had wrinkled seeds, while others were short, but had round seeds. Thus, Mendel's experiments show that the tall/short trait and the round seed/wrinkled seed trait are independently inherited.

33. In a cross between plants with purple flowers and plants with white flowers the offsprings of F1 generation all had white flowers. When the F1 generation was self-crossed, it was observed in the F2 generation that out of 100, 75 flowers were white. Make a cross and answer the following: 4mark

(i) What are the genotypes of the F_2 progeny?

(ii) What is the ratio of White: purple, flowers in the F_2 generation 4mark

Ans: When plants with purple flowers were crossed with plants with white flower

White (W) ↘ ↙ Purple (p)

(Wp) White F_1 generation

	W	p
W	WW	Wp
p	Wp	pp

(i) n the F_2 generation, the genotype is white (WW), white (Wp), white (Wp) and purple (pp). The genotypic ratio of F_2 generation is 1:2:1. The white trait is and the purple trait is

(ii) Ratio between White: Purple flowers are: 3:1

34. Why did Mendel choose pea plants for his experiments? Give any four reasons. 2mark

Ans: Mendel choose pea plants for his experiments because of the following reasons:

a) The flowers of this plant are bisexual.
b) They are self-pollinating, and thus, self and cross-pollination can easily be performed.
c) The different physical characteristics were easy to recognize and study.
d) They have a shorter life span and are the plants that are easier to maintain.

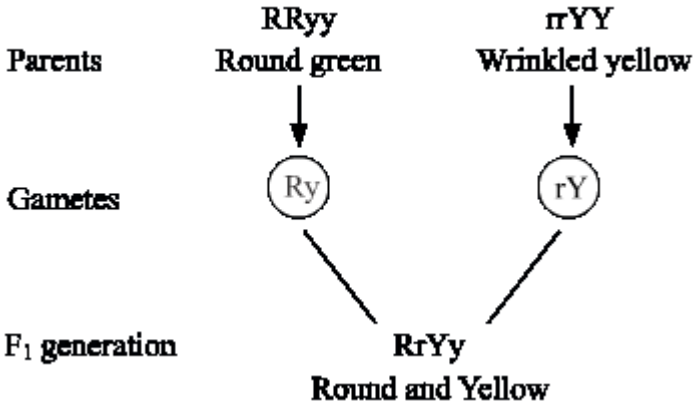
35. A cross was made between pure breeding pea plants one with round and green seeds and the other with wrinkled and yellow seeds

(a) Write the phenotype of F_1 progeny. Give reason for your answer.

(b) Write the different types of F_2 progeny obtained along with their ratio when F_1 progeny was selfed. 4mark

(a) The cross was made between round, green seeds and wrinkled, yellow seeds. In the given cross, two traits were considered, which is a dihybrid cross.

Yellow colour and round shape is dominant over green colour and wrinkled shape



The above cross shows round and yellow seeds in the F_1 generation. It occurs because dominant traits (round and yellow) express themselves, whereas recessive traits (wrinkled and green) get suppressed.

(b) On selfing of F_1 generation

	RY	Ry	rY	ry
RY	RRYY Round yellow	RRYy Round yellow	RrYY Round yellow	RrYy Round yellow
Ry	RRYy Round yellow	RRyy Round green	RrYy Round yellow	Rryy Round green
rY	RrYY Round yellow	RrYy Round yellow	rrYY Wrinkled yellow	rrYy Wrinkled yellow
ry	RrYy Round yellow	Rryy Round green	rrYy Wrinkled yellow	rryy Wrinkled green

Round yellow	:	Wrinkled yellow	:	Round green	:	Wrinkled green
9	:	3	:	3	:	1

Phenotypic ratio - 9:3:3:1
Round yellow - 9
Round green - 3
Wrinkled yellow - 3
Wrinkled green - 1

Chapter 10

Light – Reflection and Refraction

1. **Why is convex mirror commonly used as rear-view mirror in vehicles? (or)**
   Why convex mirror is used as side view mirror of vehicles? (or)
   Do we prefer convex mirrors for use as rear-view mirrors in vehicles? Why?
   Ans: o Produces direct and short reflection.
   o Having a curvature towards the outer edge, the field of view of A is greater.

2. **Sun rays falling on your mirror are focused at a distance of 15cm in front of the mirror. Where should the object be placed where the reflection is the same size as the object?**
   Ans: 30cm away from mirror.

3. **A mirror of yours produces a threefold magnified true image of an object placed 10 cm in front of it.Then how far is the image from the mirror?**
   Ans: Magnification(o) = - v/u
   -3= -v/(-10)
   +30= -v
   v=-30cm
   Image is formed at a distance of 30 cm from the mirror.

4. **In what position should the object be placed when using your mirror in the shaving mirror and torches?**
   Ans: a) In a shear mirror, → an object must be placed between the mirror pole and the principal confluence (P-F).
   b) Torches should be kept at the main confluence.

5. **The speed of light in air $3 \times 10^8 m/s$, light enters kerosene oil with index of refraction 1.47 through the medium of air. What is the speed of light in kerosene?**
   Ans: Speed of light in kerosene $= \frac{\text{speed of light in air}}{\text{(refractive index of kerosene}}$
   $= \frac{3\times10^8 m/s}{1.44}$
   $=2.04\times 10^8 m/s$

6. **Light enters glass with an index of refraction of 1.50 from air. What is the speed of light in glass? Speed of light in vacuum. ($3 \times 10^8 ms^{-1}$).**
   Ans:
   Refractive index of glass n_m= 1.50 Speed of light in vacuum c = (3×10^8 ms^{-1})
   Speed of light in glass $v = \frac{C}{n_m} = \frac{3\times10^8}{1.5}$
   $= 2\ x\ 10^8\ ms^{-1}$

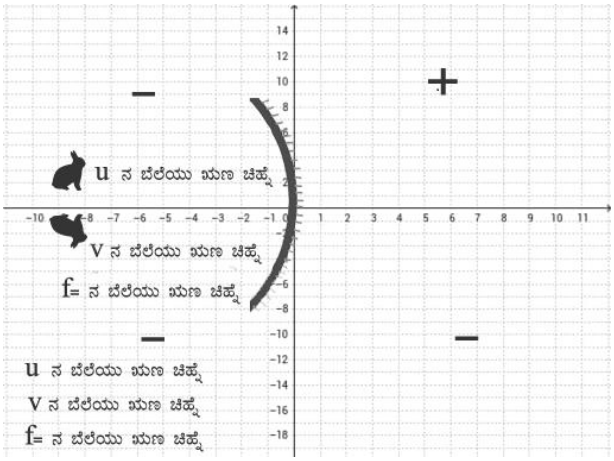
7. **The power of a lens is-1.5D. Find the converging distance of the lens. And state its nature.**
   Ans: Data P= -1.5D, f=?
   $f=\frac{1}{P}$
   $f=\frac{1}{-1.5}$ m
   $f=-\frac{1}{-1.5}$ m $=\frac{100}{-1.5}$ = -66.67cm
   f= -66.67cm
   The negative sign indicates the nature of concave lens.

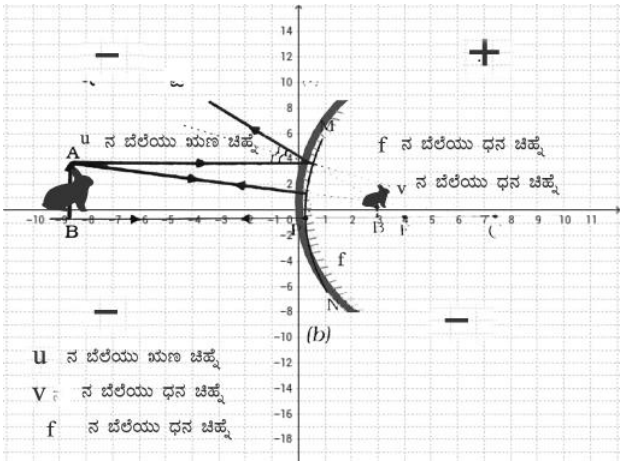
8. **Observe the table below to see which medium has the fastest speed of light. Give reasons for your answer.**
   Ans:

Media	Refractive Index
Kerosene oil	1.44
Turpentine	1.47
Water	1.33
Glass	1.65

- The speed of light is faster in water
- The speed of light decreases as the refractive index of the medium increases. In given media, the refractive index of water is low.

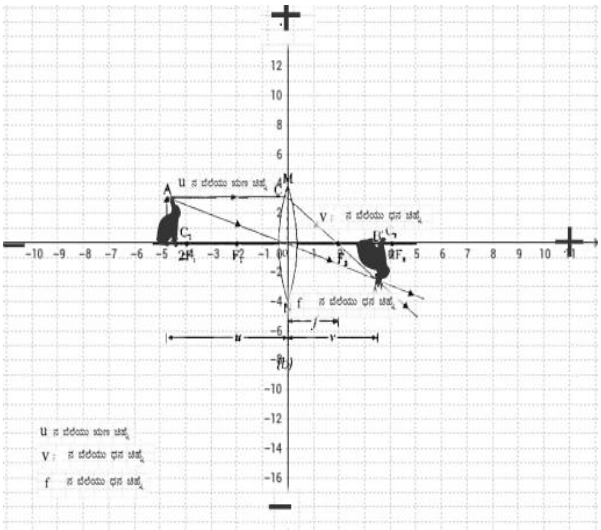
Special instruction: How to use symbols (sign)related to lenses, & mirrors, as graphs.

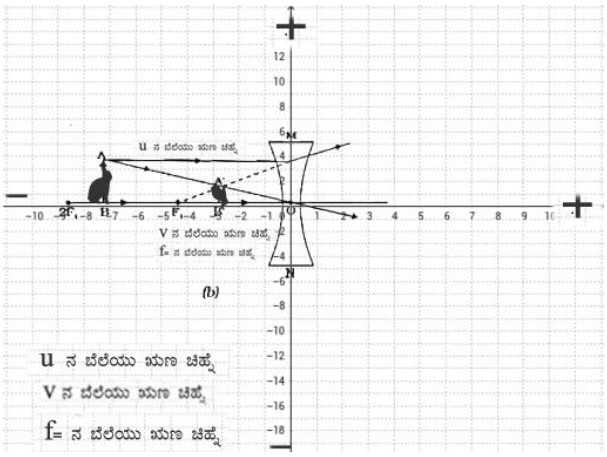




(How to use sign)
Cartesian's rule in concave mirror,
Object Distance(-u), Image Distance(-v),
Focal length (-f)

Cartesian's rule in convex mirror
Object Distance(-u), Image Distance(+v),
Focal length (+F) Symbols.



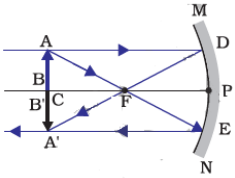


(How to use sign)
Cartesian's rule in convex Lens,
Object Distance(-u), Image Distance(+v),
Focal length (+f) .

Cartesian's rule in concave Lens
Object Distance(-u), Image Distance(-v),
Focal length (-f) Symbols.

Instruction: virtual image occurs only when an object is placed between (O/P- F) in lens or mirror.

9. **Given the Ray diagram of image is formed by concave mirror. Note this, State the following.**
   a] position of object and reflection (Image)
   b] The nature of image.



Ans:

a] Both the position of the object and the image are the same [2F]

b] Nature of image – real[truth], object- image same sized and inverted.

10. How can you identify image in, plane mirror, convex and concave mirrors without touching them?

Ans: are identified based on the nature of the image formed in the mirrors.

- In a plane mirror the size of the image is the same as the object.
- In convex mirror the size of the image is smaller than the object.
- In this concave mirror the size of the image is larger than the object.

11. A convex lens with a converging distance of 10 cm is placed at a distance of 12 cm from the wall. Find the distance at which the object must be placed from the lens to obtain a true reflection on the wall.

Ans:

Data : f=10 cm v= 12cm u=?

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{10} = \frac{1}{12} - \frac{1}{u}$$

$$\frac{1}{u} = \frac{1}{12} - \frac{1}{10} = \frac{5-6}{60} = -\frac{1}{60}$$

$$\frac{1}{u} = -\frac{1}{60}$$

u=-60 cm

The distance, from the lens to the object is placed 60 cm.

12. An object 5 cm high is placed at a distance of 25 cm from a converging lens of 10 cm focal length. Draw the line diagram, find the position, size and nature of the reflection(image).

Ans: Given data:

Size of object(height) h=5 cm.

Distance of object from focusing(converging) lens(u) =-25 cm.

Convergence length (Focal length) of converging lens(f) =10 cm.

According to lens formula $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

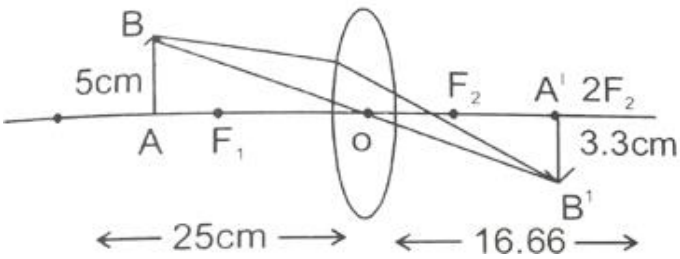
$$= \frac{1}{10} - \frac{1}{-25}$$

$$= \frac{1}{10} - \frac{1}{-25} = \frac{25-10}{250} = \frac{15}{250}$$

$$v = \frac{250}{15} = 16.66\text{cm}$$

converging lens $\frac{h^1}{h^0} = \frac{v}{u}$

$$h^1 = \frac{h^o \times v}{u} = \frac{50\times5}{3\times-25} = \frac{10}{-3} = -3.3cm$$



Since the value of the image is negative, indicates inverted (moving upside down) image the image is 3.3 cm in size at a distance of 16.66 cm behind the lens.

13. An ant standing at a distance of 10 cm from a convex lens of converging distance (Focal length) 15 cm, find the nature of its reflection (image) and the position?

Ans:

Given data: Convergence distance (Focal length) of convex lens(f)=+15cm.
Distance at which the ant stands (U)=-10cm.

According to lens formula $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$

$\frac{1}{v}=\frac{1}{15}-\frac{1}{-10} = \frac{1}{v}=\frac{2+3}{30}=\frac{5}{30}=\frac{1}{6}$

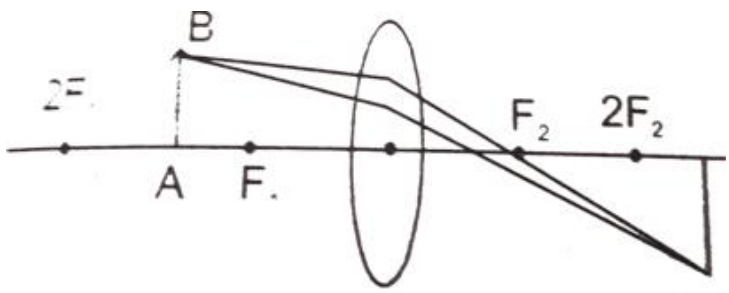
$=v=6cm$

Magnification $(m)=\frac{-v}{u}=\frac{-6}{-10}$ =0.6

Image is projected on the other side of the lens at a distance of 6 cm from the lens. As the magnification value is positive and less than 1, the reflection(image) is virtual, straight and small in size.

14. One half of a convex lens is covered with black paper. Can this lens produce a perfect reflection of an object? Test your answer empirically. Explain your observation.

Ans:



When the lower half of a convex lens is covered with black paper, the light rays from the object are refracted by the upper half of the lens, forming a reflection on the other side of the lens as shown in the figure.

15. The magnification caused by a plane mirror is +1. What does this mean?

Ans: In a plane mirror, since the value of magnification is positive, the image is false, straight and since the magnification is 1, the image is as big as the object.

16. Your lens with a focal length of 15 cm produces an image at a distance of 10 cm from it. So, how far is the object placed from the lens? Draw a diagram.

Given data: Convergence distance (Focal length) (f) of your lens is= -15cm.
Distance of image (v)=-10cm.

According to lens formula $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$

$\frac{1}{u}=\frac{1}{v}-\frac{1}{f}$

$=\frac{-1}{10}-\frac{1}{-15}$

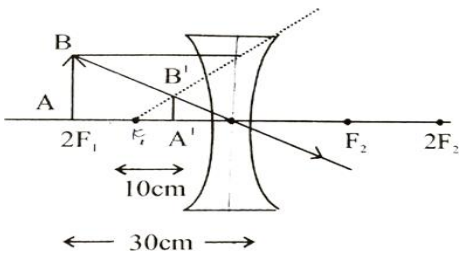
$=\frac{-1}{10}+\frac{1}{15}=$

$=\frac{-5}{150}$

$=\frac{1}{u}=\frac{-1}{30}$

$u=-30cm$

Since the object distance is negative, the object is placed at a distance of 30 cm in front of the lens, as shown in the figure.



Chapter 11 The Human Eye and the Colourful World

1. **A young adult with normal vision tries to read a book by holding it at about 10 cm from his eyes but he is not able to see the letters clearly. What is the reason for it?**
   Ans: The near point of eye is about 25 cm in a young adult with normal vision.

2. **In a person, the image of a distant object is formed in front of the retina, from which defect he is suffering from?**
   Ans: Myopia or near sightedness. Concave lens is used to correct this defect.

3. **In a person, the image of a distant object is formed behind the retina, from which defect he is suffering from?**
   Ans: Hypermetropia or Far sightedness. Convex lens is used to correct this defect.

4. **In a bi-focal lenses what is the function of concave lens and convex lens?**
   Ans: Concave lens facilitates distant vision. Convex lens facilitates near vision.

5. **White light is dispersed into its seven colour components by a prism. Why do we get these colours?**
   Ans: Different colors of light bend through different angles with respect to the incident ray as they pass through a prism.

6. **Which colour bends more and which colour is bend least in VIBGYOR?**
   Ans: The violet colour bends more. Red colour bend least.

7. **Why red colour light is used in a vehicle back side give reason?**
   Ans: Red colour light will travel longer distance with least bend.

8. **Why red colour is used in dangerous signal lights? Give the reason.**
   Ans: Red colour is the least scattered by fog or smoke. Therefore, it can be seen in the same colour at a distance.

9. **Why does the sky appear dark instead of blue to an astronaut?**
   Ans: The sky appears dark to passengers flying at very high altitude because scattering is not prominent at such height.

10. **Why colour of the sky is blue give reason?**
    Ans: The molecules of air and fine particles in the atmosphere are more effective in scattering light of shorter wavelengths at the blue end. So, sky appears in blue colour.

11. **Why does the sun appear reddish during sunrise and sunset?**
    Ans: Light from the sun near the horizon passes through thicker layers of air and longer distance in the atmosphere. Near the horizon most of the light & shorter wavelengths are scattered away by the particles. Therefore, only red light which has longer wavelength will reach our eye.so sun appears red during sunrise and sunset.

12. **Which property of light causes the following events? Rainbow, blue colour of sky, twinkling of star and advance sunrise and delayed sunset.**
    Ans: Rain Bow-Dispersion of white light
    Twinkling of stars-Refraction of light
    Blue colour of sky- Scattering of light
    Advance sunrise &delayed sunset-Refraction of light.

Chapter 12 Electricity

1. **What is an electric circuit?**
   Ans: A continuous and closed path of electric current is called a circuit.

2. **What is electric current?**
   Ans: The quantity of charges flowing through a certain field in a unit time is called electric current.
   Or
   The rate of flow of electric charges is called electric current.

3. **What is the function of a switch in an electrical circuit?**
   Ans: A contact link works between the switch, the cell and the bulb.

4. **What is Coulomb? (or)**
   Calculate the number of electrons that make up one coulomb of charge
   Ans: 1 coulomb is the electric charge of about 6x1018 electrons.

5. **What is 1 Ampere?**
   Ans: A current of 1 ampere is a current of OA per second.
   1m=1h/1s

6. **What is Ammeter?**
   Ans: An instrument used to measure the rate of current in an electrical circuit is called an ammeter.

7. **How does current flow in an electric circuit?**
   Ans: In an electrical circuit, current flows from the positive pole of the cell to the negative pole of the cell through the bulb and the ammeter.

8. **What is 1 volt? Or**
   Explain the meaning of this statement about the difference between two points.
   Ans: If 1 joule of work is done in moving one coulomb of charge from one point A to another point A between two points of any consecutive electric conductor, the potential difference between those two points will be 1 volt.

9. **How does electric potential occur?**
   Ans: Although no current is drawn through cell A, a potential is created between the cell poles due to the chemical reaction in the cell.
   When a cell is connected in a circuit the potential causes the movement of charges in the conductor and an electric current is produced.

10. **What is the instrument for measuring variation?**
    Ans: Voltmeter

11. **How is a voltmeter connected in an electrical circuit? Why?**
    Ans: These are always arranged in parallel.
    Because to measure the variation between any points

12. **State Ohm's Law.**
    Ans: At constant temperature the potential between a metal wire in an electric circuit, is directly proportional to the current flowing through it. This is called Oman's Law.

13. **What is resistance?**
    Ans: The property of resisting the flow of electric charges in a conductor is called resistance (k).

14. What is Ohm (Ω)?

Ans: The potential difference between the two ends of any conductor is 1V and when a current of 1A flows through it, the resistance of that conductor is 1Ω.

15. How is the current flowing through any resistor related to its resistance?

Ans: It has an inverse ratio.

If this resistance is doubled, the current rate is halved.

16. What is variable resistor?

Ans: A device used to control electric current without changing it by changing the voltage is called a variable resistor.

17. Which device is used to switch multiple resistors in an electrical circuit?

Ans: Rheostat

18. What is a resistor?

Ans: If a conductor has a significant resistance, it is called a resistor.

19. On what factors does conductivity depend?

Ans:

- Length of conductor
- Conductor cross section
- The nature of matter
- temperature

20. Metals and alloys are good conductors of electricity. Give a scientific reason.

Ans: Metals and alloys have low resistivities in the range of 10^{-8} to 10^{-6} Therefore

21. Alloys are used in electrical heating devices such as electric stoves and toasters. Give a reason.

Ans: The resistivity of an alloy is generally greater than that of its constituent metals and does not embrittle at high temperatures.

22. What is the metal used as the filament of electric bulb?

Ans: Tungsten

23. What are the metals used in power transmission lines?

Ans: Copper and Aluminum

24. Answer the following questions.

Which is the best conductor of iron and mercury? Iron

Which material is the best conductor? Silver

25. What are the two methods of combining resistors?

Ans: Serial and Parallel arrangement

26. What will be the value of the current flowing in the circuit when several resistors are connected in series?

Ans: The value of current is the same as in an ammeter.

27. The value of current in an electric circuit does not depend on the position of the ammeter. What does this mean?

Ans: This means that in the series combination of resistors, the p of the mandala

There is an equal current in one part of the resistor or equal current flows through each resistor.

28. What are the disadvantages of series connected circuits?

Ans:

- Connecting an electric bulb and an electric heater in series is obviously impractical.
- This is because they require widely varying values of current to function properly.
- If any one component fails in a series connected circuit, the circuit breaks down and none of the remaining components operate.

29. What are the advantages of connecting electrical equipment in parallel instead of series?

Ans:

- A parallel circuit divides the current through electrical equipment.
- The total resistance in parallel circuit decreases.
- This is particularly helpful in situations where each electrical appliance has a different resistance and requires a different current to function properly.

30. What is the thermogenic effect of electric current?

Ans: If the circuit has high resistance i.e., when the resistors are connected to the dry cell then the energy from the circuit is continuously dissipated completely in the form of heat. This phenomenon is called heat generation effect of electric current.

31. Which are the devices based on the principle of heat generation effect of electric current?

Ans: Electric Iron Box, Electric Heater, Electric Stove, Electric Kettle, Electric Bulb

32. What is the principle used to produce light in an electric bulb?

Ans: Effect of electric heat generation

33. How does the filament in a light bulb emit light?

Ans: By retaining as much thermal energy as possible, the filament emits more heat and light.

34. Tungsten is used in the manufacture of light bulbs. Give a reason.

Ans: It is a strong metal with a high melting point and does not melt at very high temperatures.

35. What is a fuse?

Ans: A fuse is a protective device that prevents any undue high current from flowing through the equipment in the circuit.

36. How does fuse work?

Ans: When a current greater than the rated current flows through the circuit, the fuse temperature increases.

This causes the puce to go along the wire and cut the circuit.

37. What is electric potential?

Ans: Power is the rate at which energy is consumed or dissipated in an electric field

38. What is 1 watt?

Ans: When an electrical device operates at 1 voltage and a current of 1A flows through it, then the power used is 1 watt.

TERMS	UNITS
Electric Charge	Coulomb 'C'
Current	Ampere (A)
potential	volt (V)
Resistance	Ohm (Ω)
Resistivity	Ohmmeter (Ω m)
Power Capacity	Watt(W)

Chapter 13 Magnetic Effects of Electric Current

1. **A student observes that magnetic field lines do not intersect each other. due cause**
   a) **Magnetic force lines repel each other.**
   b) **Magnetic field lines extend from south to north.**
   c) **At the point of intersection, the compass has to point in two directions simultaneously this is not possible**
   d) **Magnetic field lines are not clear.**

   Ans: C) At the point of intersection the compass has to point in two directions simultaneously this is not possible

2. **A student uses a cardboard tube to carry out Michael Parade's experiment in his experimental school. Conductive copper wire galvanometers, soft iron is used but experimental results are not available. Material used incorrectly here.**
   1) Galvanometers **2) Copper wire** **3) Cardboard tube** **4) Iron**

   Ans: 4) Iron

3. **When the north pole of one compass is brought nearer to the north pole of another compass, Needle points move away. The reason is**
   1) Magnetic poles attract **2) Like poles repel**
   3) Unlike poles attract **4) Magnetic poles show no change**

   Ans: 2) Like poles repel

4. **Magnetic field lines in a solenoid**
   1) Bent **2) Circular** **3) Parallel** **4) Curved**

   Ans: 3) Parallel

5. **If there is no inverter in the electric motor,**
   1) No magnetic field is created **2) Direction of current does not change**
   3) Does not affect **4) Direction does not change continuously**

   Ans: 2) Direction of current does not change

6. **A positive particle (alpha-particle) projected to the west is displaced to the north due to the magnetic field. Then the direction of the magnetic field**
   1) Southward 2) Eastward 3) Downward 4) Upward

   Ans: 4) Upward

7. **Write four characteristics of magnetic field lines.**
   Ans: Magnetic force lines are like a bent stick, Lines of force repel each other,
   Lines of force are dense near poles, Lines of force do not intersect each other

8. **Lines of magnetic field around a current-carrying conductor in circular shape why are concentric circles?**
   Ans: The magnetic field is created around the current carrying conductor and hence co-centric lines are produced
   The magnetic field is inversely proportional to the current.

9. **Write Fleming's right-hand rule. What is the electrical equipment based on this rule?**
   Ans: When the right thumb and index finger hold the middle finger perpendicular to each other, the thumb is in the direction of the conductor. The index finger indicates the direction of the magnetic field, and the middle finger indicates the direction of the induced electric current. An instrument based on this rule – an electric generator

10. Write Fleming's left-hand rule. Generate electrical equipment based on this rule.

Ans: According to Fleming's left-hand rule when the thumb and index finger are held perpendicular to each other. Thumb indicates direction of mechanical force Index finger indicates direction of magnetic field Middle finger indicates direction of electric current indicates an instrument based on this principle is an electric motor

11. Why earthing is mandatory for every electric circuit?

Ans: Earthing connection prevents leakage of current, equalizes the potential difference of the circuit and the earth, prevents electric shocks from metallic appliances.

12. State the right-hand thumb rule.

Ans: The fingers are around the thumb shows direction of magnetic field and thumb shows the direction of conductor.

13. Name the devices which use magnetic effect of electricity.

Ans: Electric motors, electric generators, loudspeakers, microphones, and electricity measuring machines.

14. Which of the following components act as a converter in an electric motor?

Ans: Split rings

15. What is armature in motor? What is its function?

Ans: An armature is a structure consisting of coils of wire wound on malleable iron

Function: - Increases the power of the motor.

16. What is electromagnetic induction?

Ans: A changing magnetic field in one conductor induces an electric current in the other conductor, this is called electromagnetic induction.

17. Name the different methods of inducing current in a coil.

Ans: Increasing the number of turns of the coil and increasing the rate of change of the magnetic field.

18. Which version of alternating current is produced in India?

Ans: 50 Hz

19. A microwave oven with 50 power rating and 8 power capacity for domestic use what effect would you expect A microwave oven with 50 power rating and 8 power capacity for domestic use what effect would you expect

I. $v = 220\ v$

$= \frac{p}{v} = \frac{2000}{220} = 9.02A$

The circuit has a rating of 5A but a current of 9.09 A is flowing in it which is more than the circuit capacity.

Overload occurs due to current flowing.

20. When does an electrical short circuit occur?

Ans:

- When live wire and neutral wire come in direct contact
- When the insulating material on the wires is damaged or there is any fault in the electrical equipment
- Connecting multiple appliances to a single socket

21. What is the function of FUSE in case of overload and short circuit in electric circuit?

Ans: A fuse with a low melting point and high resistance will melt due to the heat generated when a high voltage current flows in the circuit, cutting the circuit and protecting the electrical equipment.

22. Give scientific reason, magnetic field around them increases as the number of turns in a coil carrying current increases?

Ans: The current in the coil is unidirectional and the magnetic field produced by each turn is additive. Therefore, as the number of turns in a current-carrying coil increases, the number of turns in the coil around it increases, and the number of turns in the coil around it increases.

23. How can the current produced in a generator be increased?

Ans:

- Methods of increasing the electric current produced in a generator
- By increasing the number of coils turns
- By increasing the rate of change of magnetic field.

24. Write the difference between electric motor and electric generator.

Ans:

Electric Motor	Electric Generator
Converts electric energy into mechanical energy	Converts mechanical energy into electric energy
Works on principle of magnetic effect of electricity	works on the principle of electromagnetic effect

25. Write the difference between Electromagnet and permanent magnets

Ans:

Electromagnet	Permanent magnet
We can alter the magnetic field	Magnetic field cannot be altered
We can inter change the poles	We cannot inter change the poles

26. Write the difference between AC current and DC current .

AC Current	DC Current
Direction of current flow alters frequently	The direction of current flow is uni-directional
We can carry the electric current from one place to another place without much energy loss	We cannot carry the electric current from one place to another place
We cannot store	We can store

Chapter 14 Sources of Energy

1. **a) Why are we looking for alternative sources of energy? Explain. (OR)**
   "We are looking for alternative sources of energy" state two reasons. (3marks)
   State any two advantages and disadvantages of solar cells.
   Ans: a) reasons to looking for alternative sources of energy:
   - We look for alternative sources of energy because the conventional sources of energy like fossil fuels are in danger of getting exhausted soon.
   - Conventional sources of energy are nonrenewable and limited reserves.
   - Conventional sources of energy are causing air pollution, health hazards and environmental imbalance.

   Advantages of solar cells
   - Solar cells have no movable parts and hence need no maintenance
   - Solar cells can be set up in remote and inaccessible areas.
   - Solar cells directly convert solar energy into electrical energy. (Any two)

   Disadvantages:
   - The installation cost of solar cells is very high
   - Solar cells do not work during night, cloudy and rainy day
   - The efficiency of solar cells is very low (Any two)

2. **What kind of energy transformation takes place at a**
   a) Hydroelectric power plants b) Thermal power station. (2 Marks)
   Ans: a) Hydroelectric power plants: At a Hydropower the potential energy of water is first converted into kinetic energy which is then converted into electrical energy.
   b) Thermal power station: Here chemical energy of coal is converted into heat energy which is further changed into electrical energy.
3. **Mention any one reason due to which most of thermal power plants are set up near oil or coal fields. (1 Marks)**
   Ans: The transmission of electricity is easier and more efficient than transporting coal or petroleum over the same distance. Therefore, many power plants are set up near coal or oil fields.

4. **Explain why the energy contained in fossil fuels can be considered to be the sun's energy. (1 Mark)**
   Ans: It is understood that fossil fuels are obtained from remains of animal and plants under the earth over a period of millions of years. Those animals and plants existed and grew due to sun's energy. Thus, the ultimate source of fossil fuels can be considered to be the sun's energy.

5. **Out of two solar cookers, one was covered with a plane glass slab and the other was left open. Which of the two solar cookers will be more efficient and why? (2 Marks)**
   Ans: The solar cooker which was covered with a plane glass slab would be more efficient. The glass lid allows the heat radiation from sun to enter the solar cooker but does not allow the reflected heat radiation to go outside the box. Hence it increases heat inside the box.

6. **What is Biomass? Name the reaction take place in bio-gas plant. Give reasons to justify biogas is an ideal gas. (3 Marks)**
   Ans: Animal and plant wastes are called biomass.
   Reaction take place in bio-gas plant is anaerobic decomposition.

Biogas as an ideal gas:

- It burns without smoke
- Its heating capacity is high
- The slurry left behind is used as excellent manure.
- Safe and efficient method of waste disposal. (Any two points)

7. **Which part of the solar cooker is responsible for greenhouse effect?**
   Ans: The glass sheet in the solar cooker creates a greenhouse effect.
   (Glass sheet has a property that allows the infrared rays of shorter wavelength from the sun get in device but does not allow the reflected infrared rays of longer wavelength to leave the solar heating device.)

8. **Which metal is used to connect various solar cells?**
   Ans: Silver is used to connect various solar cells.

9. **What steps can be help minimize environmental pollution caused by burning of fossil fuels?**
   Ans: 1) Use of smokeless appliances
   2) Afforestation

10. **Name the two countries, other than India, where power plants based on geothermal energy are operational.**
    Ans: Many geothermal power plants are operational in countries such as New Zealand and united states of America.

11. **What is the main constituent of biogas? How is biogas obtained from biomass? Write any two advantages of using this gas. (3 Marks)**
    Ans: The main constituent of biogas is methane (75%). Biogas is obtained by anaerobic decomposition of biomass in a biogas plant.
    The two advantages of using this gas are:
    1) It burns without smoke.
    2) Its heating capacity is high.
    3)

12. **Name any two nutrients that the spent slurry has in the biogas plant. (1 Mark)**
    Ans: Nitrogen and phosphorus

13. **'The dams can be constructed hilly terrains like places'. Justify the statement. (OR) Mention the problems associated with constructions of big dams. (2 Marks)**
    Ans. Constructions of big dams have certain problems:
    - Large areas of agricultural land and human habitation get submerged.
    - Large eco-systems are destroyed
    - It creates the problem of rehabilitation of displaced people.
    - Rotten vegetation gives rise to large amounts of greenhouse gas called methane.

14. **Name any two elements that are used in fabricating solar cells. (1 Mark)**
    Ans: Silicon, silver.

15. **what is the working principle of nuclear reactor? (1 Mark)**
    Ans: A nuclear reactor works on the principle of self–sustaining fission chain reaction.

16. What are the hazards of nuclear power generation? (2 Marks)

Ans: Hazards of Nuclear power generation:

- Improper nuclear waste storage and disposal results in environmental contamination
- There is a risk of accidental leakage of nuclear radiation.
- Nuclear power plant installation cost is high
- Limited availability of nuclear fuels(uranium)

17. 17.Explain the process of production of biogas in biogas plant. (2 Marks)

Ans: Working of the biogas plant: Dung and domestic wastes are mixed with water in the mixing tank. The slurry so obtained is fed into the digester. Gradually, the anaerobic fermentation sets in and biogas is produced. When the pressure of gas inside the dome increases, it starts pushing the slurry into the outlet. Biogas can be taken out by spinning the gas valve.

18. List any four disadvantages of using fossil fuels. (2 Marks)

Ans: Disadvantages of fossil fuels:

- Fossil fuels are non-renewable sources of energy
- It causes air pollution
- It causes acid rain by releasing oxides of sulphur and nitrogen
- It releases greenhouse gas –carbon dioxide.
- Takes millions of years to formation of fossil fuels. (Any four)

19. Write the steps involved in generating electricity in a nuclear reactor. (2 Marks)

Ans: Steps involved in generating electricity in nuclear reactor:

- Large atoms like uranium or plutonium are bombarded by slow moving neutron.
- Large atoms break and releases lots of heat energy.
- This heat is used to boil water to steam.
- This steam rotates the turbine which produces electricity.

20. "Technological inputs to improve the efficiency of the fuels are necessary" Give any two examples to justify this statement.

Ans:

- When wood is burnt in limited supply of oxygen charcoal is formed. This is comparatively smokeless and higher heat generation capacity.
- Cow dung is decomposed in the absence of oxygen to give biogas in a biogas plant.which is an excellent fuel.

21. Write the limits of wind energy

Ans: Limits of wind energy:

- It requires large area of land.
- Initial cost of establishment is high.
- They need high level of maintenance to protect tower and blades from vagaries of nature like rain, storm etc.

22. Name two energy sources that you would consider to be renewable. Give reasons for your choices.

Ans: Solar energy and wind energy are renewable sources of energy.

- Renewable sources of energy are available abundant in nature.
- They are regularly replenished(regenerated) by natural process.

23. Give the name of two energy sources that you would consider to be exhaustible.

Ans: Fossil fuels like coal and petroleum are exhaustible.

- Nonrenewable energy sources have limited reserves in nature.
- Takes millions of years to formation of fossil fuels.

24. List any four characteristics of a good source of energy. How can the burning of fossil fuels cause acid rain? (3 Marks)

Ans: Characteristics of good source of energy are:

- Which would do a large amount of work per unit volume
- be easily accessible
- be easy to store and transport and
- be economical.
- When fossil fuels are burned, they release nitrogen and sulphur oxides into the atmosphere. Which contribute formation of acid rain.

25. What type of mirror is used in solar cookers and why?

Ans: In solar cookers, we use concave mirrors.

Because concave mirror absorbs all the incident sunlight and reflects it to a single focal point. This energy is powerful enough to cook food.

Important points:

- **Hydro power is a renewable source of energy.**
- **A quarter of energy requirement in India is met by hydro power plants.**
- **Due to gravitational pull of the moon on the spinning earth., the level of the sea rises and falls.**
- **Volatile liquid like ammonia is used to obtain electricity from ocean thermal energy.**
- **Energy sources that can be regenerated are called renewable sources of energy.**
- **Biogas is an excellent fuel as it contains up to 75% methane.**
- **Conventional sources of energy: Fossil fuels, thermal power plants, hydro power plants, biomass (biogas), wind energy.**
- **Alternative or non-conventional sources of energy:**
  Solar energy, Energy from the sea (tidal energy, wave energy, ocean thermal energy), geo-thermal energy, nuclear energy.

Chapter 15 Our Environment

1. **Name the substance caused for depletion of Ozone (OR)**
   Which carbon compound is the reason for the hole in the ozone layer? (OR)]
   Which synthetic chemical is used in refrigerants and in fire extinguishers?
   Which chemical product is banned by UNEP in 1987 (1 Marks)
   Ans: Chloroflurocarbon (CFC)

2. **How is the Ozone formed? (OR)**
   How does isotope of an oxygen occur? (OR)
   Explain How deadly poison Ozone is formed in higher level of atmosphere. (1 Marks)
   Ans: Ozone at the higher level of atmosphere is formed by UV radiation acting on oxygen molecule
   The higher energy UV radiation splits apart some molecular oxygen into free oxygen atoms.
   These atoms then combine with the molecular oxygen to form Ozone

$$O_2 \xrightarrow{UV} O+O$$
$$O+O_2 \longrightarrow O_3 \text{ (Ozone)}$$

3. **What are the safety measures to be followed to reduce depletion of Ozone? (OR)**
   What is the contribution of UNEP to protect the Ozone layer? (OR)
   How refrigerants manufacturing companies put their hands to protect Ozone layer? (OR)
   How can we control the entry of UV rays to earth from the sun? OR
   What steps are being taken to limit the damage in Ozone. (1 Marks)
   Freeze the production of CFC.
   It is mandatory to make CFC free refrigerators throughout the world.

4. **Construct a food chain (OR)**
   Write a food chain which includes producers and consumers. (1 Marks)
   Ans: Grassland: Grass → Grasshopper → Frog → snake → Eagle
   Pond: Phytoplankton → Zooplankton → small fish → crane

5. **What is biological Magnification? Give an example. (OR)**
   Usage of pesticides and eating fast foods affects living beings. justify your answer? (OR)
   Nowadays the body of living beings is a go down of chemicals, give reason? (OR)
   How do pesticides and other chemicals enter the food chain? (1 Marks)
   Ans: The accumulation of chemicals in the individuals of higher trophic level is called biological magnification.
   DDT Magnification
   (Pesticides used in crop field are absorbed by the soil, the chemical is carried to crop and accumulate in higher trophic levels).

6. **Why flow of energy is always unidirectional? (OR)**
   In Trophic levels energy never came back to sun give reason. (OR)
   Energy accumulated in herbivores never get back to producers. Justify your answer? (1 Marks)
   Ans: The energy captured by the autotrophs does not revert back to the solar input.

- The energy which passes to the herbivores does not come to autotrophs.
- As it moves progressively each trophic level gets diminished progressively due to loss of energy at each level.
- Energy is lost as heat from living beings is not used by plants for photo synthesis.

7. a) Define Ten percent (10%) law?
b) If one animal is eaten by another animal what is the energy transferred in each trophic level? Think and answer Grass ⟶Grasshopper⟶ Frog ⟶Snake,
c) In this food chain grass has 5 kJ energy then find energy got to fourth trophic level consumer? (OR)
d) If tertiary consumer has 5J of energy then find energy of producers? (1 Marks)
Ans: a) The plant trap 1% of solar energy and only 10% of the available energy is transferred from one trophic level to the next trophic level. This is called 10% law.
b) 10% energy is carried in each trophic level.
c) If grass has 5kJ energy, then Fourth Trophic level consumer has 5J of energy (10% law)
d) If tertiary consumer has 5J of energy, then producer has 5kJ of energy (10% law)

8. Give examples for biodegradable and non-biodegradable wastes? (OR)
Give examples which are decomposed by microbes, and which are not. (1 Marks)
Ans: Biodegradable: paper, peels of fruits and vegetables, plants waste, draining, sewage, worn out clothes, organic waste compost,
Non-biodegradable wastes: plastic, Bakelite, piece of metal, glass polyethene cover.

9. State the advantages of paper bags over plastic bags during shopping? (OR)
Why is the government stressing upon the use of jute/cloth carry bags? (OR)
Sneha and Sakshi are friends. Sneha use cloth bags while shopping say how she show her concern on Environment. (OR)
Now a days replacing plastic cups by paper cups for selling tea on train is preferred do you agree justify? (1 Marks)
Ans: These are biodegradable and do not produce harmful gases on recycling.
They do not pollute the environment on disposal.

10. List out four eco-friendly habits?
As a science student what are the good habits do you practice keep our surroundings clean? (OR)
How would you contribute to nature to keep fresh and clean. (OR)
To keep our surroundings clean and Tidy what are the practices should be practiced by citizens. (2 Marks)
Ans:
- Use cloth carry bags for shopping
- Use public transport
- Travel short distance through walk
- Separate the thrash into biodegradable and non-biodegradable
- Follow 5R in daily life
- Grow plants and save the environment.

11. What is the role of Ozone in the atmosphere? (OR)
Explain the importance of Ozone? (OR)

Why there has been a large hue and cry against the use of CFC. (OR)
UNEP forged to freeze production of CFC Give Reason. (OR)
Most Australians develop skin problems as they grow old. Justify your answer. (OR)
What is the impact of Ozone on ecosystem. (OR)
Damage to the Ozone layer is a cause for concern. Justify This statement? (2 Marks)
Ans:

- O_3 is an isotope of oxygen.
- Ozone shields the surface of earth from UV radiations of sun.
- UV Radiations are highly damaging to organisms for example it is known to cause skin cancer in human beings.

12. Define food chains and food web. (OR)
Write about the differences between food chains and food web. (OR)
How food chains differ from food web. (OR) (2 Marks)
Ans:

Food chain	Food web
The sequence of one organism consuming the other is known as food chain.	A network of food chain with intercrosses and linkages is called food web.
Trophic level of each organism is lined each organism at a trophic level receives food from one group of organisms.	Each organism in one trophic level receives its food from more than one group of organisms.

13. In general, the food chain includes 3-4 trophic levels, give reason. (OR)
In the food chain the number of trophic levels is restricted. Give the reason. (OR)
Grass → Grasshopper → Frog → snake → eagle, if in this food chain other two trophic levels are added what will be happen. (2 Marks)
Ans:

- In the food chain trophic levels are restricted.
- In a food chain 10% of energy is lost in every trophic levels.
- Therefore, the energy decreases in higher trophic levels higher order consumers don't get energy.

14. Natural water bodies are not regularly cleaned whereas an aquarium needs regular cleaning justify. your answer. (OR)
Can we leave the aquarium as such after we set it up? Why does it have to be cleaned once in a while. (2 Marks)
Ans:

- An aquarium is a artificial system which is also incomplete due to absence of producers and decomposers.
- An aquarium does not have an adequate number of decompositions and so it has to be cleaned once in a while.

Chapter 16 Sustainable Management of Natural Resources

1. **Switching off unnecessary lights and fans and repairing leaking taps correctly defines which terms of 5R's?**
   (a) Recycle **(b) Reuse** **(c) Repurpose** **(d) Reduce**
   Ans: (d) Reduce

2. **"We need to manage our resources." List two reasons to justify this statement**
   Ans: We need to manage our natural resources because
   - The resources of the earth are limited and
   - The proper management of our resources ensures their equitable distribution

3. **List two items which can be easily recycled, but we generally throw them in the dustbins.**
   Ans: Newspapers and tin cans are the two items that can be easily recycled.

4. **How do the advantages of exploiting natural resources with short term gains in mind differ from the advantages of managing our resources with a long-term perspective?**
   Ans: The advantages of exploiting resources with short term aim is to meet the immediate basic human needs. Short term exploitation of natural resources meets the current demand. It is beneficial for the present generation only whereas management of resources with long term perspective is aimed to fulfil the needs of future generations. Long term use of resources can be achieved through their sustainable use.

5. **Why is an equitable distribution of resources essential in a society? List two forces which are against such distribution.**
   Ans: Equitable distribution of natural resources is necessary so that all and not just a handful of rich and powerful people use them. Two forces against equitable distribution of resources are:
   - Industrialization
   - Profit makers who want to make profit from these resources.

6. **"Reuse is better than recycling materials". Give reason to justify this statement.**
   Ans: Reuse is better than recycling because the process of reuse does not require any energy as in the case of recycling. I reuse strategy comprises using things again and again. For example, used envelopes can be used again to make notes.

7. **What is sustainable development? State its two main objectives.**
   Ans: Sustainable development can be defined as management of available resources and development of new techniques for use of natural resources to meet the changing basic human needs, at the same time preserving the resources for the need of future generations. The two main objectives of sustainable development are:
   - To reduce the dependence on conventional sources and adopt non-conventional sources of energy.
   - Evolving new technology and conserving natural resources.

8. **(a)Why do we need to manage our resources carefully?**
   (b) Why does management of natural resources require a long-term perspective?
   Ans: (a) The resources of earth are limited, and their demand is increasing day by day with ever growing population. So, we have to avoid their wastage and should properly manage, conserve and replenish our natural resources.
   (b) Management of natural resources requires a long-term perspective so that they can last for generations to come and may not be merely exploited for short term gains.

9. **Every one of us can do something to reduce our personal consumption of various natural resources. List four such activities based on 3R approach**
   Ans: Activities which can reduce consumption of natural resources are as follows:

- If we take public transport instead of private transport to travel to our destinations, then we can help reduce the use of fossil fuels.
- Reusing the water used for washing vegetables, to water plants in the garden can help in saving water.
- Repairing and reusing old mobiles, televisions, etc., help reduce consumption of natural resources.
- Promoting the use of furniture made of metals, fabrics, etc., instead of wood can help to reduce the cutting of trees for making such items.

10. Why is sustainable management of natural resources necessary? Out of the two, reuse and recycle, which is better to practice in your opinion?

Ans: Sustainable management of natural resources is necessary because: The resources of the earth are limited and because of the rapid increase in human population, the demand for resources is increasing day by day. Proper management can ensure that the natural resources are used judiciously so that they fulfil the needs of the present generation and last for the generations to come.

- It also takes into consideration long-term perspective and prevents exploitation of natural resources for short-term gains.
- The process of 'reuse' is better than that of 'recycling' because some energy is used to recycle old objects, but no energy is required during reuse.

11. The country's transport system, most industries and electricity generation depend on coal and petroleum fuels, yet why should we use these fuels very carefully and sparingly?
(List 4 disadvantages of burning fossil fuels)

Ans:

- Air pollution
- Greenhouse effect
- Global temperature rise
- Non-renewable resources
- Acid rain is caused by nitrogen oxides released from the burning of fossil fuels

12. Industrialization has led to environmental degradation. Give four reasons to justify the statement.

Ans:

- Air/water/ noise and land pollution.
- Destruction of biodiversity through destruction of forests.
- Radiation pollution from nuclear power plants.
- Acid rain and global warming.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