ME 439

Sl. No.

SSLC MODEL EXAMINATION, FEBRUARY - 2025

CHEMISTRY

(English)

Time : 1½ Hours

Total Score : 40

Instructions :

- The first **15** minutes is cool-off time.
- You may use this time to read the questions and plan your answers.
- Answer only on the basis of instructions and questions given.
- Consider score and time while answering.

Score

SECTION - A

Answer any 4 questions from 1 to 5. Each question carries 1 score. **4x1=4**

1. During the laboratory preparation of ammonia, quick lime is used as a _____. 1

2. How many electrons are present in the outermost subshell of noble gases except helium ? 1

3. The molecular mass of oxygen is 32. What is the volume of 320 g oxygen at STP ? 1

4. Which is the by-product obtained in the industrial production of soap ? 1

5. Identify the pair of metals refined by liquation. 1
(Sn and Pb, Zn and Cd, Al and Fe, Cu and Ag)

SECTION - B

Answer any 4 questions from 6 to 10. Each question carries 2 scores. **4x2=8**

6. The molecular mass of carbon dioxide (CO_2) is 44.
   (a) What is the mass of $2 \times 6.022 \times 10^{23}$ molecules of CO_2 ? 1
   (b) What will be the mass of nitrogen having the same number of molecules as that of 264 g CO_2 ? 1
   (Molecular mass of nitrogen = 28)

7. The IUPAC name of a hydrocarbon is 2,3-Dimethylbutane.
   (a) Write the structural formula of the given hydrocarbon. 1
   (b) A hydrocarbon has 4 carbon atoms in the main chain. There are two methyl groups on the second carbon atom. Write its IUPAC name. 1

P.T.O.

Score

8. Complete the table. 2

Properties of ore	Properties of impurities present in the ore	The method of concentration
Magnetic in nature	Non-magnetic in nature	_____(a)_____
Low density	High density	_____(b)_____
High density	Low density	_____(c)_____
Non-magnetic in nature	Magnetic in nature	_____(d)_____

9. The structural formulae of four organic compounds are given.
   (i) $CH_3-CH_2-CH_2-CH_3$
   (ii) $CH_3-CH_2-O-CH_3$
   (iii) $CH_3-CH_2-CO-CH_3$
   (iv) $CH_3-CH_2-CH_2-OH$
   (a) Write the structural formula of the chain isomer of compound (i) 1
   (b) Identify the pair of functional isomers. 1

10. Consider the following chemical equation.

$$CH_3-CH_2-CH_3 \xrightarrow{Heat} \underline{A} + CH_4$$

   (a) Write the structural formula of A. 1
   (b) What is the product obtained when A is subjected to polymerisation ? 1

SECTION - C

Answer any 4 questions from 11 to 15. Each question carries 3 scores. 4x3=12

11. (a) The size of air bubbles rising from the bottom of a water tank increases. Give reason. 1
   (b) State the gas law related to it. 1
   (c) The volume of a fixed mass of a gas at 2 atm pressure is 20L. What will be its volume if pressure is increased four times without changing the temperature ? 1

12. A galvanic cell is to be constructed using the suitable metals and salt solutions given in the box.

Mg, Cu, Fe, Zn, Ag, $AgNO_3$ solution, Na_2CO_3 solution, $MgSO_4$ solution, $FeSO_4$ solution

   (a) Which of the following pairs of metals acts as anode and cathode respectively ? (Zn-Fe, Cu-Mg, Mg-Fe, Mg-Cu) 1
   (b) Write the chemical equation of the redox reaction taking place in the above cell. 1
   (c) Write the chemical equation of the reaction taking place at the silver electrode, if silver (Ag) is used as one of the electrodes in the cell. 1

Score

13. Some sugar is taken in a watch glass. On adding the substance X into it, a black substance is formed.

(a) Identify the substance X. 1

(b) Explain the chemical process involved in this change. 1

(c) When X reacts with potassium nitrate, an acid is formed. Write the chemical equation of the reaction taking place here. 1

14. The element A belongs to the third period and second group in the periodic table. The element B belongs to the second period and 16^{th} group.

(Symbols are not real)

(a) Write the subshell electronic configuration of A. 1

(b) Write the subshell electronic configuration of the noble gas present in the same period as that of B. 1

(c) Write the chemical formula of the compound formed when A combines with B. 1

15. (a) Match columns **A**, **B** and **C** suitably. 1

A	B	C
Rectified spirit	5-8% Ethanoic acid	– O – R
Vinegar	95.6% Ethanol	– COOH
		– OH

(b) Complete the following chemical equation and write the IUPAC name of the product. 2

$$CH_3COOH + HO-CH_2-CH_3 \xrightarrow{Con.H_2SO_4} \_\_\_\_ + H_2O$$

SECTION - D

Answer any 4 questions from 16 to 20. Each question carries 4 scores. **4x4=16**

16. The subshell electronic configuration of chromium ($_{24}Cr$) is written in two ways.

(i) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^4\ 4s^2$

(ii) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^1$

(a) Which is the most stable configuration ? 1

(b) Explain the reason for your answer. 1

(c) Write the stable subshell electronic configuration of copper ($_{29}Cu$). 1

(d) Write the period number and group number of copper. 1

Score

17. Electricity is passed through a colourless solution of sodium salt.

The observations are given below.

- Chlorine gas is liberated at the anode.
- On adding 2-3 drops of phenolphthalein to the solution, the solution turns pink.

Answer the following questions :

(a) What is the reason behind the change in colour of the solution ? Which product formed makes colour change in the solution ? 1

(b) Write the chemical equation of the reaction taking place at the cathode. 1

(c) If molten sodium chloride is used instead of the solution, write the chemical equations of the reactions taking place at anode and cathode. 2

18. A reversible reaction is given.

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) + Heat$

(a) How does increase in temperature influence the rate of forward reaction ? 1

(b) What happens to the amount of product formed when pressure is increased ? 1

(c) Ammonia formed is removed frequently. How does it affect the rate of forward reaction ? 1

(d) State the principle applicable here. 1

19. Calamine and zinc blende are two ores of zinc.

(a) What is the method for concentration of zinc blende ? 1

(b) After concentration calamine and zinc blende are converted into zinc oxide by two different methods. Explain the methods. 2

(c) Which method is used to refine zinc metal ? Identify the specific property of zinc chosen for this process. 1

20. (a) Which of the following hydrocarbons can undergo addition reaction ? 1

$(C_4H_{10}, C_5H_{12}, C_4H_8, C_3H_8)$

(b) Write the chemical equations of the addition reaction of this hydrocarbon with Cl_2 and H_2. 2

(c) Write the IUPAC name of the product formed by the addition of HCl to the hydrocarbon $CH_3 - CH = CH - CH_3$. 1

- o O o -