SSLC MODEL EXAMINATION, MARCH - 2021

CHEMISTRY

(English)

Time : 1½ Hours | Total Score : 40

Instructions :

- **20 minutes** is given as cool-off time.
- Use cool-off time to read the questions and plan your answers.
- Attempt the questions according to the instructions.
- Keep in mind, the score and time while answering the questions.
- The maximum score for questions from **1** to **32** will be **40**.

Each question from 1 to 8 carries 1 score. **Score**

1. **Which among the following subshell has the highest energy ?** **(2s, 3p, 3d, 4s)** (1)

2. Identify the relation and fill the blank. (1)
   Vinyl chloride : Polyvinylchloride (PVC)
   Tetrafluoroethene : _____

3. Bauxite is the ore of _____ metal. (1)

4. Select the general formula of alkynes. (1)
   (C_nH_{2n}, C_nH_{2n+2}, C_nH_{2n-2}, C_nH_{4n})

5. 1 GMM (Gram Molecular Mass) of a substance contains _____ number of molecules. (1)

6. Which of the following metal reacts vigorously with dilute hydrochloric acid ? (1)
   (Mg, Cu, Fe, Pb)

7. The gas which produced when ammonium chloride (NH_4Cl) heated with calcium hydroxide ($Ca(OH)_2$) is _____ (1)

8. **In the process of electroplating copper on an iron bangle, the bangle is connected to which terminal of the battery ?** (1)

(Score)

Each question from 9 to 16 carries 2 score.

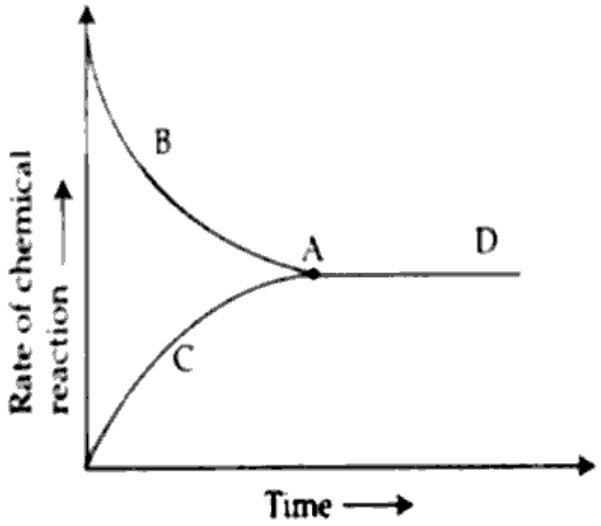
9. (a) Name a method of concentration of an ore in which impurities are heavier than the ore particles. (1)
   (b) Select an ore which can be concentrated by using this method. (1)
   (Fe_3O_4, $ZnCO_3$, $CaCO_3$, ZnS)

10. (a) Which metal is deposited at the cathode when molten sodium chloride (NaCl) is electrolysed ? (1)
    (b) Write the chemical equation of the reaction at cathode. (1)

11. $CH_3-CH_2-CH_2-OH$
    (a) Identify the functional group in this compound. (1)
    (b) Give its IUPAC name. (1)

12. (a) Write the stable electronic configuration of Chromium (Cr : atomic number 24). (1)
    (b) Explain about this electronic configuration. (1)

13.



    (a) Which portion of this graph shows chemical equilibrium ?
    (b) Why chemical equilibrium is called dynamic equilibrium ?

14. (a) How ethanoic acid is industrially prepared ?
    (b) Write the chemical equation of this reaction.

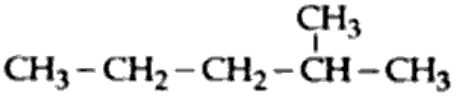
15. (a) Select the oxidation reaction from the given chemical equations.
    (i) $Cu^{2+} + 2e^- \rightarrow Cu$
    (ii) $Zn \rightarrow Zn^{2+} + 2e^-$
    (b) When a metal oxidises, how does its oxidation number changes ?

16. The molecular formula of a hydrocarbon is C_4H_{10}. This is a branched chain compound. The branch is a methyl group.
    (a) Write the structural formula of the compound.
    (b) Give its IUPAC name.

Score

Each question from 17 to 24 carries 3 score.

17. The chemical formula of two different chlorides of iron (Fe) are given.
    (i) Ferrous chloride - $FeCl_2$
    (ii) Ferric chloride - $FeCl_3$
    Atomic number of Fe is 26 and oxidation state of chlorine is -1.
    (a) Find the oxidation states of Fe in these compounds. 2
    (b) In which subshell the last electron of iron atom is filled ? 1

18. 

    (a) Write the position number of the branch. 1
    (b) Name the branch. 1
    (c) Write the IUPAC name of the compound. 1

19. (a) What is the relation between pressure and volume of a fixed mass of gas when temperature kept constant ? 1
    (b) Which gas law explains this relationship ?
    (c) The volume of a fixed mass of gas is 100 L when it is kept at a pressure of 2 atm. Find its volume when its pressure is doubled keeping the temperature constant. 1

20. 1 mL of Sodium Sulphate solution is taken in a test tube, add two or three drops of Barium Chloride ($BaCl_2$) solution in it. A white precipitate is formed and it is not soluble in dilute hydrochloric acid.
    (a) What is the chemical name of the white precipitate ? 1
    (b) Which ion can be identified by this test ? 1
    (c) Write the chemical equation for this reaction. 1

21. When a Zinc rod is dipped in Copper sulphate ($CuSO_4$) solution, the following observations are found.
    (i) Copper is deposited on Zinc.
    (ii) The intensity of the colour of Copper sulphate solution decreases.
    (a) Which metal is more reactive ? 1
    (b) Explain the reason for observation (ii). 1
    (c) Write the chemical equation of the reaction.

22. Give the suitable method for refining of a metal with respect to the following.
    (a) The metal which easily vapourises. 1
    (b) Melting point of the metal is very low. 1
    (c) Refining of copper. 1

23. Select the **correct** statements that shows the characteristic properties of d block elements. 3
    (a) They show high ionisation energies.
    (b) The last electron is filled in the penultimate shell.
    (c) Most of the compounds of these elements are coloured.
    (d) Many of them are used as catalysts in the petroleum industry.
    (e) These elements are found in groups 3 to 12 of the periodic table.
    (f) They are all non-metals.

24. Concentrated ore can be converted into its oxide by calcination or roasting.
    (a) Distinguish between roasting and calcination. 2
    (b) Which of the following ores are usually subjected to calcination ? 1
    (Sulphide ores, Carbonate ores, Sulphate ores)

Each question from 25 to 32 carries 4 score.

25. Analyse the given table and complete it. 4

Substance	GMM	Mass in grams	No. of mole	Volume at STP in L
O_2	36	360	(a)	224
NH_3	17	(b)	5	112
CO_2	(c)	88	2	44.8
HCl	36.5	73	2	(d)

26. A galvanic cell is constructed by Silver (Ag) electrode and Copper (Cu) electrode. Reactivity of Cu is greater than Ag.
    (a) What is the energy change taking place in a galvanic cell ? 1
    (b) Give the direction of flow of electrons in this galvanic cell.
    (c) Write the name of the cathode. 1
    (d) Write the chemical equation of the reaction at anode. 1

27. $N_2 + 3H_2 = 2NH_3 + Heat$

How does the following changes affect the rate of forward reaction ?

(a) More nitrogen is added **1**

(b) Temperature is decreased **1**

(c) Pressure is increased **1**

(d) Ammonia produced is removed from the system **1**

28. Identify the pair of isomers and name the isomerism. **2+2**

(a) $CH_3-CH_2-CH_2-CH_2-CH_3$

(b) $CH_3-CH_2-CH_2-CH_2-OH$

(c) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3$

(d) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_3$

(e) $CH_3-CH_2-O-CH_2-CH_3$

(f) $CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3$

29. (a) Compare the following properties of a substance which exist in liquid state and gaseous state. **3**

(i) The energy

(ii) Attractive force between molecules

(iii) Freedom of movement of molecules

(b) Even though gas molecules are continuously colliding with each other, there is no loss of energy. Why ? **1**

30. Haematite is converted to iron by using blast furnace.

(a) Haematite, limestone and _____ are fed into the blast furnace. **1**

(b) In blast furnace reduction of Haematite (Fe_2O_3) into iron is done mainly by carbon monoxide. Write the chemical equation of this process. **1**

(c) From the furnace impurities are removed as slag. Complete the chemical equation which shows the formation of slag. **1**

_____ + $SiO_2 \rightarrow CaSiO_3$

(d) The molten iron obtained from the furnace contains impurities. What is the name of the iron obtained ? **1**

31. The atomic number of Manganese (Mn) is 25.

(a) Write the subshell electronic configuration of Manganese. **1**

(b) Find the group and period of Mn in the periodic table. **2**

(c) What is the subshell electronic configuration of Mn^{2+} ion ? **1**

32. Some chemical reactions are given. Select the suitable name of the reactions from the box.

Thermal cracking
Substitution reaction
Addition reaction
Combustion

(a) $CH_2=CH_2+H_2 \rightarrow CH_3-CH_3$

(b) $2C_2H_6+7O_2 \rightarrow 4CO_2+6H_2O$

(c) $CH_3-CH_2-CH_3 \rightarrow CH_4+CH_2=CH_2$

(d) $CH_4+Cl_2 \rightarrow CH_3Cl+HCl$

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