327

SSLC MODEL EXAMINATION—FEBRUARY, 2012

Chemistry

Time : 1½ hrs. Total Score : 40

Instructions :

* Answer all questions.
* First 15 minutes is given as 'cool-off time' in addition to 1½ hours. Use this time to read and understand the questions.
* Answer the questions only after reading and understanding the questions thoroughly.
* Manage the time properly to answer the questions.
* Scores for each question is given against each question.
* Questions with choice are included. For such questions answer only one question.
* Write the question numbers for main and sub-questions correctly.

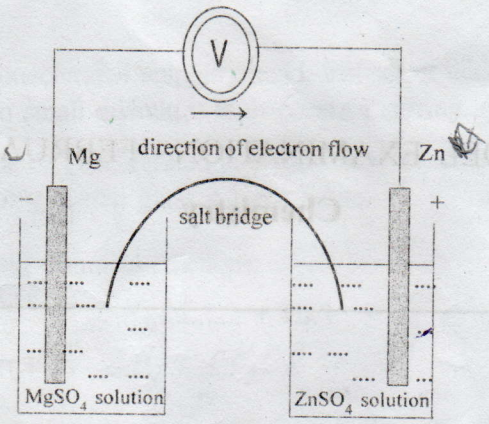
1. Definite mass of a gas at 1 atm pressure and 298 K is taken in a 5 L vessel.
   (a) Suggest one method for increasing the pressure of the gas. (1)
   (b) What will be the pressure of the gas when it is transferred into another vessel of 20 L capacity at the same temperature? (2)
   (c) State the gas law applied in the above situation. (1)

2. Match column 'A' by selecting suitable choices from column 'B':

A	B
$1s^2\ 2s^2\ 2p^6$	Most reactive non-metal
$1s^2\ 2s^2\ 2p^5$	Transition metal
$1s^2\ 2s^2\ 2p^6\ 3s^2$	Group 13 element
$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^5\ 4s^2$	Alkali metal
$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1$	Inert gas
$1s^2\ 2s^2\ 2p^1$	Alkaline earth metal

(3)

3. Examine the figure of an electrochemical cell given below and answer the questions:



(a) Identify the anode and cathode. (1)

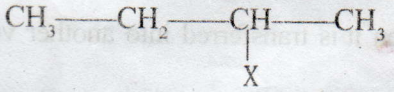
(b) Write the chemical reactions taking place at anode and cathode. (2)

4. Chemical reaction between zinc and hydrochloric acid is given as:

$$Zn + 2HCl \rightarrow ZnCl_2 + H_2$$

This reaction is conducted in two test tubes 'A' and 'B' containing 10 ml each of dilute HCl. In test tube 'A', a single piece of Zinc weighing 2g is added while in test tube 'B', 2g zinc powder is added. In which test tube the evolution of hydrogen gas is faster? Give reason. (2)

5. The structural formula of an organic compound is given below:



Write the IUPAC name of the compound obtained when X is replaced by

(a) –Cl (1)

(b) –OH (1)

(c) $–CH_3$ (1)

6. An extract of the periodic table is given below. Examine and answer the following questions. [The symbols given are not real]

p-Block

13	14	15	16	17	18
P				R	
	Q Atomic No. 14				S

(a) Give the sub-shell electronic configuration of the element on the right of 'Q' in group 15. (1)

(b) Of the four elements given, which is an inert gas? (1)

(c) Write the formula of the possible compound formed between P and R (1)

7. In the extraction of iron from haematite a mixture of concentrated ore, coke and limestone are added from the top into the blast furnace. Explain the role of limestone in this process with the help of chemical equation. (2)

8. The chemical equation involved in one of the steps in the manufacture of ethanol is given as:

$$C_6H_{12}O_6 \xrightarrow{\text{Zymase}} \underset{\text{8-10 \% ethanol}}{2C_2H_5OH} + 2CO_2$$

(a) 8-10% solution of ethanol is commonly known as wash (1)

(b) How will you prepare rectified spirit from 8-10 % ethanol? distillation (1)

(c) How is 'denatured spirit' obtained from ethanol? (1)

9. [This question has **choice**. Answer **any one** question]

Identify the pairs of position isomers from the following compounds:

(i) $CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_3$

(ii) $CH_3 - CH_2 - CH_2 - CH_2 - Cl$

(iii) $CH_3 - CH_2 - CH_2 - Cl$

(iv) $CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_2 - CH_2 - CH_3$

(v) $CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_2 - CH_3$

(vi) $CH_3 - CH_2 - CH_2 - CH_2 - CH_2 - Cl$ (3)

OR

Alcohols are functional group isomers of ethers

(a) Write the structural formula of propan—2—ol. (1)

(b) Write the structural formula and IUPAC name of the ether which is a functional group isomer of propan—2—ol. (2)

10. Two statements related to sulphuric acid are given below. Examine each statement and give reason.

(i) While diluting concentrated sulphuric acid, instead of adding water to acid, acid is added to water in small quantities with constant stirring.

(ii) When a fewdrops of concentrated sulphuric acid is added to some blue vitriol ($CuSO_4 . 5H_2O$) in a watch glass it turns white. (2)

11. Complete the following chemical reactions:

(a) $CH_4 + Cl_2 \xrightarrow{\text{sunlight}}$ CH_3Cl ..... + HCl (1)

(b) $CH_2 = CH_2 + HCl \rightarrow$ $CH_3 - CH_2Cl$ (1)

12. Carbon monoxide and oxygen combine to form carbon dioxide. This reversible reaction is given as:

$$2CO_{(g)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)} + \text{heat}$$

(a) What happens to the forward reaction when the temperature of this system at equilibrium is increased? (1)

(b) State the principle applied here and justify your answer on the basis of this principle (2)

13. [This question has **choice**. Answer **any one** question.]

A balanced equation for the combustion of methane gas in oxygen is given below:

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

(a) How many moles of carbon dioxide are produced in the complete combustion of one mole methane? (1)

(b) Calculate the mass of carbon dioxide formed by the complete combustion of 80g of methane. (2)

OR

The reaction between hydrogen gas and oxygen gas to form water vapour at STP is given below:

$$2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(g)}$$

(a) How many moles of hydrogen react completely with one mole of oxygen? (1)

(b) Calculate the volume of water vapour formed at STP when 10g of hydrogen react completely. (2)

[*Hint*:—Atomic masses: C = 12, H = 1, O = 16]

14. Chemical substances present in medicines are responsible for curing and resisting diseases.

(a) Medicines used to lower body temperature are commonly called ———— (1)

(b) Many unhealthy practices are found in our society in the use of medicines. Give any three examples and suggest probable solutions. (3)