Total No. of printed pages = 4

Sc-103/Chem-I/1st Sem/2014/N

CHEMISTRY – I

Full Marks – 70

Pass Marks – 21

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No.1 and any *six* from the rest.

1. (a) Give the answer of the following : 1×5=5

(i) What is the numerical value of molar gas constant in S.I unit ?

(ii) What is the oxidation number of 'S' in H_2SO_4 ?

(iii) How many orbitals are there in a p-subshell ?

(iv) Give an example of a transition element.

(v) How many pi bond are there in a N_2 molecule ?

[Turn over

(b) Fill in the blanks : 1×5=5

(i) Lewis acids are ——— acceptor.

(ii) Grams per litre = Normality × ———.

(iii) $K_p = K_c \times$ ———.

(iv) 1 Faraday = ——— coulomb.

(v) Manufacture of ammonia by Haber's process is catalysed by ———.

2. (a) State and explain Dalton's law of partial pressure. 3

(b) The total pressure exerted by a mixture of 3.2 grams of oxygen and 2 grams of hydrogens is 22 atmosphere at 273 k. Calculate the partial pressure of each gas. 3

(c) Give electronic concept of oxidation and reduction with examples. 4

3. (a) What do you mean by soft water and hard water ? 2

(b) Discuss permutit process for softening of water. 4

(c) Give two industrial applications of catalysis. 4

4. (a) Write the imporant postulates of Bohr's atomic model. 4

(b) Write electronic configuration of aluminium (atomic No. 13) and chromium (atomic No. 24). 3

(c) State and explain modern periodic law. 3

5. (a) Give the differences between an ionic bond and a covalent bond. 3

(b) Discuss the formation of NaCl and H_2O with electron dot structure. 4

(c) Define acids and bases in terms of Bronsted-Lowry concept. 3

6. (a) What do you mean by normality and molarity of a solution ? 2

(b) 5.3 grams of sodium carbonate is dissolved in 100 ml of water. Calculate the normality and molarity of the solution. 4

(c) State and explain Faraday's 1st law of electrolysis. 4

7. (a) State Le-Chatellier's principle. 2

(b) For the reaction

$N_2(g) + 3H_2(g) \rightleftharpoons 2\,NH_3(g) + 93.5\ kJmol^{-1}$

indicate the direction of equilibrium shift when

(i) temperature is decreased

(ii) pressure in increased. 2

(c) What do you mean by pH of a solution ? Calculate the pH of 0.1M HCl and 0.01M NaOH solution. 2+4=6

8. Write short notes on : 2½×4=10

(a) Oxidizing agent and reducing agent

(b) Quantum number

(c) Common ion effect

(d) Hydrogen bond.