Total No. of printed pages = 5

Sc-103/Chem-I/1st Sem/Com/2017/N

CHEMISTRY-I

Full Marks – 70

Time – Three hours

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

PART – A

1. Fill in the blanks : 1×5=5

   (i) 44 gram of CO_2 contains —— number of molecules.

   (ii) In the manufacturing of H_2SO_4 by contact process —— is used as catalyst.

   (iii) Conjugate acid of ammonia is ——.

   (iv) Magnetic quantum number imply —— of atomic orbitals.

   (v) The melting and boiling points of covalent compounds are —— than those of ionic compounds.

[Turn over

2. Give the correct answer of the following : $1\times5=5$

(i) Rain water is hard / soft / sterilized / like mineral water.

(ii) A standard solution is 0.1N / 1N / 0.1M / any solution of known strength.

(iii) Faraday is a unit of current/charge/voltage/ resistance.

(iv) Due to common ion effect dissociation of weak electrolyte is

Increased / decreased / not affected / may or may not affected.

(v) NH_4Cl is a neutral / acidic / basic / complex salt.

3. Answer the following in one word / sentence : $1\times5=5$

(i) State Avogadro's hypothesis.

(ii) What is the volume of 16 gram of Oxygen at STP ?

(iii) Give one example of an oxydising agent.

(iv) What is Buffer solution ?

(v) What is the principal quantum number of the last electron of sodium ?

4. Match the following correctly : $1 \times 5 = 5$

(a) Dual nature of electron	(i) Electrolysis
(b) Faraday	(ii) Hydrogen ion concentration
(c) Inhibitor	(iii) Charge
(d) PH	(iv) De-Broglie
(e) Electroplating	(v) Rate of chemical reaction

5. State true or false for the following statements : $1 \times 5 = 5$

(i) Aufbau principle is related to electronic configuration.

(ii) Covalent bond is stronger than ionic bond.

(iii) A set of P-orbitals can accommodate 10 electrons.

(iv) C.E = e.c.e × Faraday.

(v) Fe is used as catalyst in the Haber process of manufacturing ammonia.

PART – B

Answer any *five* questions.

6. (a) For ideal gas derive PV= nRT. 3

   (b) Prove that molar volume of all gases is 22.4 litre at STP. 3

   (c) Calculate the volume occupied by 51 gram of ammonia gas at 273k and 760 mm pressure. 3

7. (a) Balance the following reaction by partial method : 3

   $Cu + HNO_3 = Cu(NO_3)_2 + NO + H_2O$

   (b) With electronic concept, explain that Oxidation and Reduction take place simultaneously. 3

   (c) Calculate the amount of CO_2 produced by 24 gram carbon reacts with 32 gram oxygen. 3

8. (a) Explain Lowry-Bronsted theory of Acid-Base. 3

   (b) 1.325 gram of Na_2CO_3 is dissolved in 250 ml of water. Calculate the strength of the solution in normality. 3

(c) 20 ml of 0.1N solution of NaOH is neutralized by 15 ml of H_2SO_4. Calculate the strength of H_2SO_4 in g/l. 3

9. (a) What is Ionisation energy ? How it change in period and groups of periodic table ? 3

(b) State law of Mass Action. Derive an expression for equilibrium constant for the reversible reaction 4

$$aA + bB \leftrightarrow cC + dD$$

(c) What is Buffer solution ? 2

10. (a) Write the drawbacks of Bohr's model of atom. 4

(b) Explain Hund's rule of maximum multiplicity with example. 3

(c) Write the electronic configuration of Na^+ and Cr. 2

11. Write short notes on the following : $3 \times 3 = 9$

Electroplating

Homogeneous catalysis

Quantum numbers.