

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 :

1×5=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 be affected.
- (v) NH_4Cl is a neutral/acidic/basic/complex salt.

3. Answer the following in one word/sentence :

1×5=5

- (i) State Avogadro's hypothesis.
- (ii) What is the volume of 16 gram of Oxygen at STP?
- (iii) Give one example of an oxidising agent.
- (iv) What is Buffer solution?
- (v) What is the principal quantum number of the last electron of sodium?

4. Match the following correctly :

1×5=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 :

1×5=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) $C.E = e.c.e \times \text{Faraday}$.
- (v) Fe is used as catalyst in the Haber process of manufacturing ammonia.

PART - B

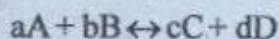
Answer any five questions.

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
- $$\text{Cu} + \text{HNO}_3 = \text{Cu}(\text{NO}_3)_2 + \text{NO} + \text{H}_2\text{O}$$
- (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



(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.