Total No. of printed pages = 7

END SEMESTER / RETEST EXAMINATION, J/F 2023

Semester : 1st

Branch : Common

Subject Code : Sc-103

CHEMISTRY – I

Full Marks – 70

Time – Three hours

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

Instructions :

(i) *All* questions of PART – A are compulsory and objective types.

(ii) Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : 1×5=5

(a) Temporary hard water contain _____ of Ca and Mg.

(b) One Faraday = _____ Coulomb.

[Turn over

(c) $AlCl_3$ is an example of _____ acid.

(d) Nitrogen molecule contain _____ pi bond.

(e) Magnetic quantum number determines _____ of electrons.

2. Choose the correct answers : 1×5=5

(a) The boiling point of HF is greater than HCl due to the presence of

(i) Ionic bond (ii) Covalent bond

(iii) Hydrogen bond (iv) Dativ bond

(b) One moie of Hydrogen gas is equal to

(i) One gram of Hydrogen

(ii) Two grams of Hydrogen

(iii) One molecule of Hydrogen

(iv) One litre of Hydrogen

(c) Isotones are the elements having

(i) Same number of protons

(ii) Same number of electrons

(iii) Same number of neutrons

(iv) Same number of positrons

(d) pH of 0.01(M) NaOH solution is

(i) 10 (ii) 11

(iii) 12 (iv) 13

(e) An aqueous solution of Sodium Carbonate is

(i) Less acidic (ii) More acidic

(iii) Alkaline (iv) Neutral.

3. Write short answers in *one* word /sentence each : 1×5=5

(a) What is the relationship between E.C.E and C.E ?

(b) Which element has the highest electon affinity ?

(c) What is the oxidation number of Mn in $KMnO_4$?

(d) What is the name of the catalyst that is used in the manufacture of Ammonia by the Haber's process ?

(e) What is a decinormal solution ?

4. Match the following : 1×5=5

Column-A	Column–B
(a) Charle's Law	(i) Dynamic in nature
(b) Eriochrome black-T	(ii) Lone pair of electron
(c) Chemical Equillibrium	(iii) Volume-Temp relationship
(d) Ionisation Enthalpy	(iv) Hardness of water
(e) Ammonia	(v) Electron volt per atom

5. State True or False for the following statements : 1×5=5

(a) The addition of a catalyst does not change the state of equilibrium of a chemical reaction.

(b) KCN molecule contains only ionic bond.

(c) The conjugate acid of water is OH^-.

(d) In a Redox reaction oxidation and reduction take place simultaneously.

(e) 22 gm of CO_2 occupies 11.2 litres at S.T.P.

PART – B

Marks – 45

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

(b) What is an ideal gas ? Deduce the ideal gas equation PV = nRT 1+3=4

(c) Balance the following equation by ion electron method (any *one*) : 3

(i) $Cr_2O_7^{2-} + H^+ + Fe^{2+} \rightarrow Cr^{3+} + Fe^{3+} + H_2O$.

(ii) $MnO_4^- + Cl^- + H^+ \rightarrow Mn^{2+} + H_2O + Cl_2$.

7. (a) Discuss the electronic concept of oxidation and reduction with examples. 2

(b) What is Normal solution and Molar solution ? 2

(c) How much NaOH is to be dissolved in water to prepare 250 ml of 0.1(N) NaOH solution ? 3

(d) What are the limitations of Bohr's atomic model ? 2

8. (a) What are Quantum numbers ? Discuss the physical significance of Quantum numbers. 1+3=4

(b) State the modern periodic law. What do you mean by periodicity in properties of elements ? 3

(c) Draw the Lewis electron dot structure (any *two*) : 2

(i) CO_2, (ii) H_2O, (iii) NH_3.

9. (a) What is homogeneous and heterogeneous catalysis ? Explain with examples. 3

(b) State the Lechetelier's principle and describe its one industrial application. 3

(c) A current of 0.4 ampere strength passing through $AgNO_3$ solution for 5 minutes deposits 0.2122 gm of Ag. What is the E.C.E of Ag ? 3

10. (a) State the differences between electrolytic cell and electrochemical cell. 3

(b) What are the difficulties arise in boiler when hard water is used ? 2

(c) What is hardness of water ? How the hardness of water is removed by Ion-Exchange method. 1+3=4

11. Write short notes on any *three* : 3×3=9

(a) Buffer solution

(b) Hydrogen bonding

(c) Conjugate acid-base pair

(d) Electron Affinity.