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**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 :  $1 \times 5 = 5$

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

(b) One Faraday = \_\_\_\_\_ Coulomb.

[Turn over]

(c)  $\text{AlCl}_3$  is an example of \_\_\_\_\_ acid.

(d) Nitrogen molecule contain \_\_\_\_\_ pi bond.

(e) Magnetic quantum number determines \_\_\_\_\_ of electrons

2. Choose the correct answers :

$1 \times 5 = 5$

(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) Dative bond

(b) One mole 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) Isotopes 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 :

$1 \times 5 = 5$

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

- (b) Which element has the highest electron affinity?

- (c) What is the oxidation number of Mn in  $\text{KMnO}_4$ ?

- (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 Equilibrium | (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<sup>-</sup>.
- (d) In a Redox reaction oxidation and reduction take place simultaneously.
- (e) 22 gm of CO<sub>2</sub> occupies 11.2 litres at S.T.P.

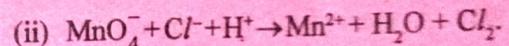
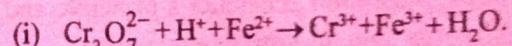
PART - B

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



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

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

3

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

3

(c) A current of 0.4 ampere strength passing through  $\text{AgNO}_3$  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 :  $3 \times 3 = 9$

(a) Buffer solution

(b) Hydrogen bonding

(c) Conjugate acid-base pair

(d) Electron Affinity.