

(3 Hours)

Total Marks: 80

- N.B.:** 1) All questions are compulsory
2) Answer all sub questions together
3) Figures to right indicate full marks

Q.1 (a) Explain the terms (Any 5)

5

- i) Curie
- ii) Formal Charge
- iii) Rate law
- iv) Homogeneous catalyst
- v) Emetics
- vi) Covalent bond

b) Answer the following (Any 5)

10

- i) Give ground state electronic configuration of Calcium and Magnesium.
- ii) Draw an energy profile diagram for a two-step reaction showing activated complex, intermediate, activation energy and reaction exotherm in it
- iii) Explain the term nucleophilic catalysis
- iv) Name any two physiological buffers and explain how they are useful?
- v) State and explain significance of antioxidants as an inorganic pharmaceutical agent
- vi) Discuss the role of Zinc as essential and trace elements.

c) Match the following

5

	Column A	Column B
i)	Molybdenum	Membrane excitability
ii)	Sodium bisulphite	Antioxidant
iii)	Chloride	Essential & trace element
iv)	Potassium	Antacid
v)	Mg Trisilicate	Regulate osmotic pressure

Q.2 a) Define the following

4

- i) Normal isotope effect
- ii) Inverse isotope effect
- iii) Primary isotope effect
- iv) Secondary isotope effect

b) Answer the following (Any 2)

4

- i) Write the use and mechanism of action for Potassium Permanganate and Iodine Preparations
- ii) What are astringents and state any two examples for the same?
- iii) What is use and mechanism of action for Ammonium chloride?

c) Enlist various units of radioactivity. Give the properties of beta particles.

2

d) Elaborate role and conditions related to changes in the concentration of magnesium and calcium as major physiological ions

2

Q.3 a) Write a note on electrophilic catalysis and phase transfer catalysis

4

- b) Mention classification of gastrointestinal agents. Give one example and use for each class **4**
- c) Explain inductive effect concept by suitable example **2**
- d) Draw Lewis structure and calculate the formal charge on underlined atom **2**
- NH₄⁺ PCl₅

Q.4 a) Fill in the blanks with reference to CH₄ **4**

- i) In CH₄ the central atom is ---- and shows ---- hybridization
- ii) Its ground state electronic configuration is ----- and excited state configuration is ---
- iii) Its geometry is ----- with bond angle of ----.
- iv) Its structure can be represented as -----
- b) Classify and explain mechanism of action and uses for : Talc , Titanium dioxide **4**
- c) Explain Principle of Hammond Postulate in kinetics. Discuss connection between Hammond's postulate and reactivity –selectivity principle **4**

Q.5 a) State true or false **4**

- i) Increase in s character for hybridized orbitals of molecule increases bond angle
- ii) In energy surface diagram blue colour contour suggests electronegative group.
- iii) dx²-y² has electron density on x and y axes
- iv) Azimuthal quantum number decides orbital types such as s, p, d or f
- b) Write a note on general acid catalysis and explain correlation graphs **4**
- c) Write a note on cyanide poisoning and its treatment **2**
- d) Explain need for electrolyte replacement therapy and treatment **2**

Q.6 Answer the following (Any 6) **12**

- i) Complete the following:
- 10 millicurie =----- Bq
- 5 ×10¹²dps = --- Curie
- ii) How many years will it take for 84 grams of tritium to decay to a 23.5 g sample?(t_{1/2}12.3yr)
- iii) Elaborate role of chelating agents in therapy
- iv) How many mEq of Potassium chloride contained in one liter of Injection of 1.1% w/v solution
- v) Explain the terms molecularity and order of reaction.
- vi) State and explain Curtin – Hammett principle.
- vii) Classify the following agents: Bismuth subnitrate, calamine, hydrogen peroxide, sodium thiosulphate.
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