(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) Node
ii) Absorption dose
iii) Systemic antacid
iv) Astringents
v) Complexing agents
vi) Cathartics

b) Answer the following (Any 5)   **10**
i) What is meant by an Inductive effect? In which of the following examples inductive effect observed: Acetone, Hydrogen, Ethane, Flurobutane
ii) Draw an energy profile diagram showing Activated complex, intermediate, activation energy and reaction endotherm in it
iii) Explain the term catalysts and classify them
iv) What is mEqv scale ? What is its significance
v) State and explain significance of emetics as an inorganic pharmaceutical agent
vi) Discuss the role of Iron as essential and trace elements.

c) Match the following   **5**

	Column A	Column B
i)	Selenium	Extracellular ion
ii)	Hypophosphorous acid	Antioxidant
iii)	Chloride	Essential & trace element
iv)	Potassium	Acidifying agents
v)	Dil. Hydrochloric acid	Intracellular ion

Q.2 **a)** Write a detail note on Kinetic Isotope Effect   **4**

b) Answer the following (Any 2)   **4**
i) Write the use and mechanism of action for Hydrogen Peroxide and precipitated sulfur
ii) What are antioxidants and state any two examples for the same

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iii) Give the role of iodine as essential ion and enlist products for the same.

c) Enlist various units of radioactivity . Give the properties of gamma particles. **2**
d) Write down role and conditions related to changes in the concentration of sodium and calcium as major physiological ions **2**

Q.3 **a)** Explain nucleophilic catalysis and phase transfer catalysis with suitable examples **4**
b) What are the ideal properties of antacids and how you can overcome the side effects of antacids. **4**
c) Add a note on Quantum Numbers **2**
d) Calculate the formal charge on underlined atom (**Any 2**) **2**
   PCl5 $\underline{Si}$F4, H2SO4, (H2$\underline{P}$O4) $^{-1}$

Q.4 **a) Fill in the blanks with reference to BCl3** **4**
i) In BCl3 the central atom is ---- and shows ---- type of 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) What are protective topical agents and write details of any two agents **4**
c) i) Explain reactivity vs selectivity principle **2**
ii) '1,3-Butadiene on addition of HBr at lower temperature gives 1,2 addition product and at higher temperature 1,4 addition product'. Explain the underlying principle and mention names of two categories of products formed in it **2**

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

i) Group electronegativity of CF3 is higher than CH3
ii) The more chlorine atom attached to methane to CCl4 lower is the dipole moment
iii) Bond lengths for sp3 hybridized bond is lower than that of sp hybridized bond
iv) As we move down in the column polarizability increases

b) Write a note on Bronsted Acid Base catalysis. Explain correlation of reaction rates with acidity functions through relevant examples. **4**
c) Write a note on cyanide poisoning and its treatment **2**
d) Add a note on importance of calcium and phosphate ions **2**

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

i) Complete the following:

20 millicurie =------ Bq

6.8×10^{12} dps = --- Curie

ii) Pd^{100} has a half life of 3.6 days. If its initial amount has 6.02×10^{23} atoms , how many atoms would be present after 23 days.

iii) Enlist electrolytes used in replacement of sodium, potassium and calcium and mention their use

iv) How many mEq of Magnesium ions are present in 1% $MgCl_2$ solution

v) Explain the terms reaction order and rate law

vi) State and explain Hammond's Postulate

vii) Classify the following agents: silver nitrate, magnesium trisilicate, EDTA**,** sodium hypochlorite

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