Q. P. Code: 22581

(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) Radioactivity
        ii) Antiseptic
        iii) Hypocalcemia
        iv) Half life
        v) Principal Quantum Number
        vi) Sclerosing agent

b) Answer the following (Any 5)   **10**
        i) What are physiological functions of zinc?
        ii) Draw Lewis structure for PO_4^{-3} and HNO_3
        iii) Give ground state electronic configuration of Neon and Potassium.
        iv) Explain phase transfer catalysis in brief.
        v) Enlist ionic composition of the body fluids and state the significance
        vi) Arrange the following compounds in increasing order of s-character:
            CH_4, PCl_5, SF_6, BeF_2

c) Match the following   **5**
Column A	Column B
i) HPO_4^{-2}	a) Rochelle salt
ii) Zinc oxide	b) Topical protective agent
iii) Roentgen	c) Principal intracellular anion
iv) NH_3	d) Exposure dose
v) Sodium potassium tartrate	e) Triagonal pyramidal

Q.2   **a)** What is Kinetic isotope effect? Why kinetic isotopic studies are performed?
        How to express it, explain with suitable example?   **4**
        b) Answer the following (Any 2)   **4**
        i) Give the uses of Talc and potassium permanganate.
        ii) What are expectorants? How do they act?
        iii) Write a note on antioxidants?

c) Fill in the blank:

When $^{226}Ra_{88}$ emits -----the atomic number decreases by____ and atomic mass

number decreases by ____ of resulting nuclei   **2**

d) Define hyponatremia. What are its causes?   **2**

Q.3 a) What is catalysis? Give its principle and elaborate on covalent catalysis   **4**
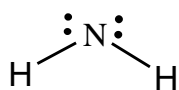b) Classify gastrointestinal agents. Elaborate on saline cathartic with suitable example. **4**
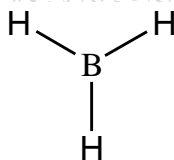c) Define Inductive effect and electronic configuration.   **2**
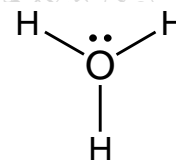d) Calculate the formal charge on central atom (Any 2)   **2**

(i)   (ii)   (iii)

Q.4 **a)** Complete the following table on the basis of hybridization concept.   **4**

Molecule	Hybridized state of underlined atom	Bond angle
$\underline{P}Cl_5$		
$\underline{C}H_3-CH_3$		
$\underline{Al}Cl_3$		
$\underline{S}F_6$		

b) Classify and Give mechanism of action of following agents   **4**
Zinc peroxide, Silver nitrate, Titanium dioxide, Povidone iodine

c) State and explain the Curtin-Hammet principle.   **2**

d) In the Sulphonation of naphthalene, identify which is a kinetically controlled
and which is thermodynamically controlled product.   **2**

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

i) Electronegativity is related to ionization energy and electron affinity.

ii) Bond angle of BF_3 is 180° by hybridization theory.

iii) Red colour in electrostatic potential surface indicate electronegative region.

iv) $H_2C=CHCl$ behaves as nonpolar molecule

b) Write a note on specific acid catalysis or general base catalysis.   **4**

c) Define antidote. Classify them based on mechanism of action with suitable example. **2**

d) Define buffer capacity and buffer action. Enlist different physiological buffers that maintains physiological acid-base balance.   **2**

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

i) Calculate rate constant and half-life for first order reaction, if 90% of substance reacted within 10 min.

ii) Write a note on electrolyte replacement therapy.

iii) Enlist biochemical functions of copper.

iv) Discuss the biological effect of radiation.

v) Give any four clinical application of I-131.

vi) The half-life of Zn-71 is 2.4 minutes. If a patient had 100 mg at the beginning, how many grams would be left over after 7.2 minutes has elapsed?

vii) Draw the reaction coordinate diagram for two step exothermic reaction and show which is a rate determining step

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