

Time (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

- Node
- Heterogeneous catalyst
- Roentgen
- Rate determining step
- Physiological buffers
- Acidifying agents

**b) Answer the following (Any 5)**

10

- Give ground state electronic configurations for Beryllium and Fluorine
- Enlist any four essential and trace elements. Explain the term "Haematinics"
- Draw Lewis structures: HCN,  $\text{SO}_4^{2-}$
- Explain phase transfer catalysis with suitable examples
- Classify and state uses: Calamine, Antimony Potassium tartarate
- Explain physiological role of bicarbonate **OR** potassium ion

**c) Match the following**

5

	<b>Column A</b>	<b>Column B</b>
i)	EDTA	Calamine
ii)	Cr-51	Chelating agent
iii)	Aluminum chloride	Planar geometry
iv)	$\text{BF}_3$	Survival time for RBCs
v)	Zinc carbonate	Electrophilic catalyst

**Q.2 a) i) Complete the following sentences**

2

- Isotope effect  $k_H/k_D > 1$  is called as ---- and  $k_H/k_D < 1$  is known by -----
- Isotope effect is maximum for ---- element
- Isotope effect is used for determining ----- of reaction

ii) What is a secondary isotope effect? Explain with an example

2

**b) Answer the following (Any 2)**

4

- Give applications for: Hydrogen peroxide, Titanium dioxide
- Add a note on "Sclerosing agents"
- Classify and state uses: Hypophosphorus acid, Sodium bisulphite

c) Discuss the clinical applications of Technetium-99 **OR** radioactive iodine

2

d) Calculate the number of mEq/L of  $\text{CaCl}_2$  for 1.1% w/v solution

2

**Q.3 a) i) Draw reaction coordinate diagram for catalysed and uncatalysed reaction**

2

ii) State the form/ type of catalyst in the following:  $\text{R}_4\text{N}^+\text{X}^-$ ,  $\text{AlCl}_3$ ,  $\text{NH}_3$

2

b) i) What are gastrointestinal agents? Give their classification

2

ii) Write a note on 'Saline cathartics'

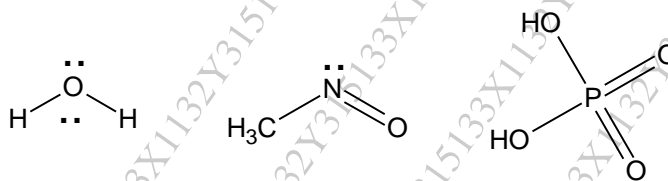
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**c) Give reasons**

2

- $\text{AlCl}_3$  is more polarisable than  $\text{NaCl}$
- $\text{NF}_3$  has a lower dipole moment than  $\text{NH}_3$

d) Calculate the formal charge on **central atom** (Any 2) 2



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

Molecule	Hybridization state of the underlined atom	Molecular shape
<u>B</u> F <sub>3</sub>		
<u>P</u> Cl <sub>5</sub>		
H <sub>2<u>S</u></sub>		
<u>Be</u> F <sub>2</sub>		

b) Discuss classification, mechanism of actions and examples for antimicrobials 4

c) Explain thermodynamic and kinetic control on a chemical reaction 2

d) State the underlined principle in the following 2

- i) If a reagent is more reactive then it is less selective
- ii) The pathway for conversion of product back to reactant is the exact replica of the forward pathway

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

- i) Cyclohexane shows negligible quadrupole moment
  - ii) HCl is more ionic than KCl
  - iii) As s character increases bond angle goes on increasing
  - iv) CH<sub>3</sub>Br and CH<sub>3</sub>F have same dipole moment
  - v) In potential energy surface diagram blue colour indicates electropositive potential
- b) Define: Specific acid. Derive an expression for specific acid catalysis and explain relevant correlation graphs 4
- c) Write a note on cyanide poisoning and its treatment 2
- d) Discuss electrolyte combination therapy 2

Q.6 Answer the following (Any 6) 12

- a) In a certain drug stability testing 1/10 th of the drug gets decomposed in
- b) hours at 40° C. Calculate half life for the same if it follows first order kinetics
- c) Explain the importance of copper as a trace element
- d) What is a 'Ringer solution?' Give its composition and use
- e) State and explain Hammond's postulate
- f) Give applications of complexing agents in therapy
- g) Complete the following:
- h) <sup>226</sup>Ra<sub>88</sub> gives ----- + α particle
- i) 1.5 millicurie = ----- Becquerel
- j) By suitable diagram explain the concept: Energy hypersurface, Saddle point