

**KHYBER PAKHTUNKHWA, PUBLIC SERVICE COMMISSION**  
**COMPITITIVE EXAMINATION FOR THE POSTS OF PROVINCIAL MANAGEMENT**  
**SERVICES (BPS-17)**

**CHEMISTRY PAPER-II**

**Time Allowed: 03 Hours**

**Max. Marks: 100**

**Note: Attempt any five questions. All questions carry equal marks.**

- Q. No. 1 a)** Explain geometries of the following molecules on the bases of VBT. (15)
- i)  $\text{ICl}_2^-$  ii)  $\text{SbF}_5^{-2}$  iii)  $[\text{PF}_6]^-$  iv)  $\text{H}_2\text{O}$  v)  $\text{IF}_7$
- b)** Justify this statement on the basis of Molecular Orbital Theory, (05)  
"O<sub>2</sub> is a paramagnetic molecule"
- Q. No. 2 a)** How will you differentiate between Order and Molecularity? What are the factors which affect the Reaction Rate Constant? (10)
- b)** What is meant by the Second Order reaction? Derive the kinetic equation for Second Order reaction. What are the units of k for a second order reaction? (10)
- Q. No. 3 a)** Describe the mechanism of Enzyme Catalysis. What are important features of Enzyme Catalysis? (15)
- b)** How will you compare physical adsorption and chemisorption? (05)
- Q. No. 4 a)** What is meant by Conformational Analysis? Discuss the conformational analysis for ethane. (10)
- b)** Explain the mechanism, kinetics and stereochemistry of S<sub>N</sub>1 and S<sub>N</sub>2 reactions with examples. (10)
- Q. No. 5 a)** What is Aldol condensation? Discuss its mechanism with suitable examples. (10)
- b)** How are aldehydes synthesized? Discuss various methods for the preparation of aldehydes. (10)
- Q. No. 6 a)** What are Electrophilic Substitution Reactions? Discuss their mechanism with suitable examples. (12)
- b)** Benzene has a hexagonal planar structure. Justify this statement. (08)
- Q. No. 7 a)** What are Amines? How are they classified? Describe five methods for the synthesis of aromatic amines. (12)
- b)** What are Azo dyes? How are they prepared. Discuss their uses. (08)
- Q. No. 8 a)** What are Petrochemicals? Explain their importance. What is the future of Petrochemical industry? (10)
- b)** What are Vitamins? How are they classified? Discuss their role in human body. (10)

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