

**Q.P. Code :24014**

**[Time: 3 Hours]**

**[ Marks: 80]**

Please check whether you have got the right question paper.

- N.B:
1. Question No. 1 is compulsory.
  2. Attempt any three questions from remaining five questions

**Q.1** Answer any four of the following **20**

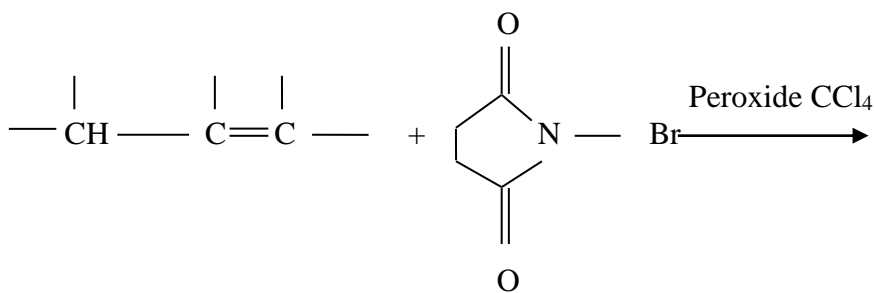
- a) Explain the structure of  $XeF_4$  on the basis of VSEPR Theory.
- b) Write IUPAC names of the following co-ordination compounds –
  - i)  $[Zn(NCS)_4]^{2-}$
  - ii)  $[Ag(NH_3)]Cl$
- c) Explain preparation, properties and bonding involves in  $Fe(CO)_5$ .
- d) Differentiate between transition state and intermediate.
- e) Compare the stability of tertiary, secondary, primary and methyl carbocation. Justify your answer using inductive effect and hyper conjugation.
- f) Define Quantum yield. Explain the reasons for high quantum yield.

**Q.2** a) What is photolysis? Explain Norrish type-I and Norrish type II with mechanism. **5**

- b) Write the chemical formula of the following co-ordination compounds- **5**
- i) Potassiumhexacyanoferrate (II)
  - ii) Tetracyanonickelate (II) ion

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- c) Complete the following reaction. State the name of the reaction and show the mechanism of the same 5



- d) Explain biochemistry of enzyme containing Zn. 5

**Q.3** 5

- a) Draw molecular orbital diagram for HF molecule and comment on its bond order and magnetic properties. 5

- b) What is EAN? Calculate EAN of  $[\text{Ni}(\text{CO})_4]$  5

- c) Explain the structure of singlet carbene. Discuss the stability of carbenes. 5

- d) Differentiate between photochemical and thermochemical reactions. 5

**Q.4** 5

- a) Discuss the formation of carbanion. 5

- b) What are the shortcomings of VBT. 5

- c) What is CFSE? Calculate CFSE for high and low spin octahedral complexes. 5

- d) State: 3

1. Grothus Draper law.
2. Stark Einstein law.

II) Define 2

1. Fluorescence
2. Phosphorescence

- Q.5** **5**
- a) Discuss mechanism of Pinacol Pinacolone rearrangement w.r.t. symmetrical diol. **5**
  - b) Explain oxygen atom transfer biomolecular reaction containing iron. **5**
  - c) What is hydrogen bonding? Explain with example intermolecular and intramolecular hydrogen bonding. **5**
  - d) List the limitations of CFT. **5**
- Q.6**
- a) On the basis of MOT ,explain energy level diagram of NO molecule. **5**
  - b) Explain the role of stability of carbocation in addition reaction of HBr to propylene . **5**
  - c) Write a note on ionization isomerism and linkage isomerism. **5**
  - d) When naphthalene is sulphonated at 80<sup>0</sup>c , which product will predominate? Justify your answer. **5**

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