PC – 376 CV-19
(533) M.Sc. Chemistry (Third Semester)
Examination Dec-2020
Compulsory/Optional
Physical Organic Chemistry
Group -
Paper -

Time : Three Hours] **[Maximum Marks : 80**
[Minimum Pass Marks :

नोट : दोनों खण्डों से निर्देशानुसार उत्तर दीजिए। प्रश्नों के अंक उनके दाहिनी ओर अंकित है।
Note : Answer from both the Section as directed. The figures in the right-hand margin indicate marks.

Section-A

1. Answer the following questions in few words: 1 X 10

(a) Which halogen nucleophile is weakest in polav aprotic solvents?
(i) I^- (ii) F^- (iii) CI^- (iv) Br^-

(b) Give example of typical Hard Acids.

(c) Which of the following compounds would be the best nucleophile.
(i) CH_3S^- (ii) CH_3O^- (iii) NH_3 (iv) CH_3SH

(d) Rank the following compounds in order of increasing nucleophilicity.
(i) NH_3 (ii) H_2O (iii) CI^- (iv) F^-

(e) What is Curtin – Hammett principle.

(f) What do you understand by steric strain in organic compound?

(g) What is the difference between hyper conjugation and resonance?

(h) State whether the following is aromatic or antiaromatic or non-aromatic.

(i) What three critical factors affects Gibbs free energy change.

(j) Carbon monoxide has ten bonding electrons and four antibonding electrons. Calculate the bond order.

2. Answer the following questions: 2 X 5

(a) What do you understand by aromaticity?

(b) Explain ambivalent – nucleophile with example.

(c) What is Marcus theory of electron - transfer.

(d) What is Huckel rule? Explain with example.

(e) Explain nucleophilicity scale.

Section-B

Unit-I

3. Explain Huckel molecular orbital method as a means to explain modern theoretical methods. 12

Or

Write notes on : (a) Congugation and hyper congugation (b) Orbital Symmetry

Unit-II

4. What are hard and soft acids and bases : Explain acidity functions and their application. 12

Or

Explain the following : (a) Acid – base catalysis (b) Micellav Catalysis

Unit-III

12

5. Explain the various types of steric strain and their influence on reactivity.

Or

Write notes on : (a) Hammond's Postulate (b) Radical Stability

Unit-IV

12

6. Discuss in detail the electron transfer nature of SN_2 reactions.

Or

Explain in detail :

(a) Structural effects on rates and selectivity.

(b) Curve crossing approach to electrophillic reactivity.

Unit-V

12

6. Explain various types of steric strain and their influence on reactivity.

Or

Write notes on : (a) Winstein – Holness and curtin Hammett Principles (b) Steric L F E R