

PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
M.Sc. Winter 2019-20 Examination

Semester: 3**Subject Code: 11205201****Subject Name: Pericyclic Reactions, Photochemistry and Free Radicals****Date: 26/11/2019****Time: 02:00 pm to 04:30 pm****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1. A) Essay type (Each of 04 marks) (08)**
 (a) Differentiate pericyclic reactions from ionic or free radical reactions with example.
 (b) Explain the classification of pericyclic reactions giving one example of each.
- Q.1. B) Answer the following questions (Any two)**
- (a) Short note (Each of 02 marks) (04)
 1. Explain HOMO and LUMO with diagram.
 2. Explain symmetric and antisymmetric orbitals with diagram.
- (b) Discuss \rightarrow^* transition in 1,3-butadiene, (04)
 (c) Draw the pi-molecular orbitals of 1,3,5-hexatriene. (04)
- Q.2. A) Answer the following questions.**
- (a) Short note (Each of 02 marks) (04)
 1. Discuss the MOs of Allyl system.
 2. How electron withdrawing groups helps in (4+2) cycloaddition reaction?
 (b) Explain (4+2) cycloaddition with example. (04)
- Q.2. B) Answer the following questions (Any two)**
- (a) Do as directed. (Each of 01 marks) (03)
 1. Define electrocyclic reaction.
 2. The Nth MO will have Nodes.
 3. If the MOs are symmetric they will undergo motion for the bond formation.
 (b) Why 1,3-dipolar cycloaddition reaction are photo-chemically forbidden? (03)
 (c) Explain electrocyclic reaction of (E,Z)-2,4-Hexadiene in photochemical condition. (03)
- Q.3. A) Essay type (Each of 04 marks) (08)**
 (a) Discuss cis-trans isomerization in alkenes.
 (b) Discuss Di-Pi Methane (DPM) rearrangement with example.
- Q.3. B) Answer the following questions (Any two)**
- (a) Do as directed. (04)
 1. Define Inter system crossing and Internal conversion.
 2. Give one example of natural photo fries rearrangement.
 (b) Explain photo fries rearrangement with mechanism. (04)
 (c) Explain Phenanthrene formation by free radical mechanism. (04)
- Q.4. A) Answer the following questions.**
- (a) Short note (Each of 02 marks) (04)
 1. Draw structure of triphenyl methyl radical and explain its stability.
 2. How nitrosonium ion is formed in Sandmeyer reaction.
 (b). Explain the reaction and mechanism of Sandmeyer reaction. (04)
- Q.4. B) Answer the following questions (Any two)**
- (a) Short note (Each of 01 marks) (03)
 1. Which one is a dipolarophile?
 (A) Ethene (B) Propene (C) 1-butene (D) All of these
 2. Example(s) of sigmatropic rearrangement
 (A) Cope rearrangement (B) Claisen rearrangement
 (C) Carroll rearrangement (D) All of these
 3. Bullvalene formula is
 (A) C₅H₁₀ (B) C₁₀H₁₀ (C) C₅H₂₀ (D) C₁₀H₂₀
 (b) Explain Barton reaction with mechanism. (03)
 (c) How electronegativity of atoms affects the free radical stability? (03)