

PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
M.Sc.Winter 2018-19 Regular Examination

Semester: 3

Date: 23/10/2018

Subject Code: 11205201

Time: 10.30 am to 1.00 pm

Subject Name: Pericyclic Reactions, Photochemistry and Free Radicals

Total Marks: 60

Instructions:

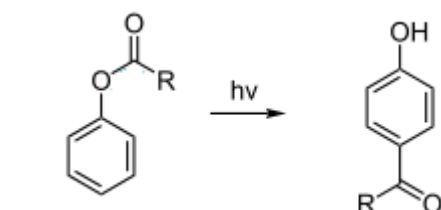
- All questions are compulsory.
- Figures to the right indicate full marks.
- Make suitable assumptions wherever necessary.
- Start new question on new page.

Q.1. A) Answer the following in detail (08)

- Explain shape and hybridization of primary, secondary and tertiary free radicals and their relative stability with respect to each other.
- Draw energy correlation diagram of 1,3,5-hexatriene showing electronic configurations in ground state and excited state in HOMO and LUMO.

Q.1. B) Answer the following questions (Any two) (04)

- Give mechanism for and names of the following reactions



2.



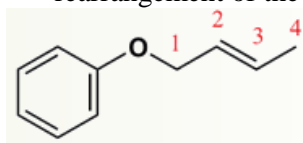
- Explain Woodward-Hoffman rules for sigmatropic rearrangements. (04)
- Describe types of pericyclic reactions with one example each. (04)

Q.2. A) Answer the following questions. (04)

- Answer the following questions in brief (04)
 - Explain Cope rearrangement with suitable example.
 - Explain suprafacial and antarafacial cycloaddition reactions.
- Describe which rotation is allowed for $4n$ and $4n+2$ systems in thermal and photochemical conditions. (04)

Q.2. B) Answer the following questions (Any two) (03)

- Answer the following multiple choice questions. (03)
 - Which side chain carbon makes a new bond to the benzene ring upon Claisen rearrangement of the following allyl phenyl ether.



- (a) C1 (b) C2 (c) C3 (d) C4
 - Stability of free radicals is due to (03)
 - Resonance (b) Hyperconjugation (c) Inductive effect (d) Symmetry
 - During di-pi methane rearrangement the new bond is formed between (03)
 - C1 and C2 (b) C3 and C5 (c) C2 and C3 (d) C4 and C5
- Write a short note on 1,3-Dipolar cycloaddition reactions with examples. (03)
 - Explain Diel's Alder reactions with examples of 2+2 and 4+2 cycloaddition. (03)

Q.3. A) Answer the following in detail. (08)

- (a) Give any four methods of generation of free radicals.
(b) Explain mechanism of formation of chlorobenzene and cyanobenzene using Sandmeyer reaction.

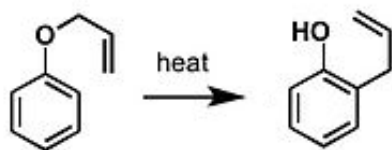
Q.3. B) Answer the following questions (Any two)

- (a) Answer in brief (04)
1. Hunsdiecker Reaction
2. Electrocyclic reactions with an example.
(b) Draw energy correlation diagram of 1,3-butadiene showing electronic configurations in ground state and excited state in HOMO and LUMO. (04)
(c) Give mechanism of diazotization of aniline in presence of NaNO_2 and HCl . (04)

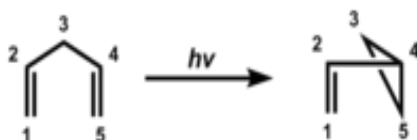
Q.4. A) Answer the following questions.

- (a) Give mechanism for and names of the following reactions (04)

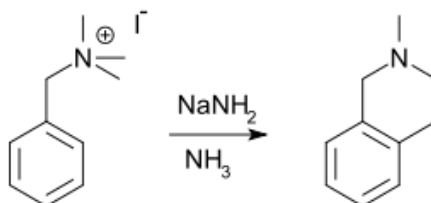
1.



2.



- (b) Give mechanism for the following Sommet-Hauser rearrangement. (04)



Q.4. B) Answer the following questions (Any two)

- (a) Match the following (03)
(1) Hunsdiecker reaction (i) Benzyl quaternary ammonium salts
(2) Sommet-Hauser rearrangement (ii) N-Halogenated amine
(3) Hoffmann-Loffler-Freytag reaction. (iii) Silver salts of carboxylic acids
(b) Draw energy correlation diagram of 1,3-Butadiene showing electronic configurations in ground state and excited state in HOMO and LUMO. (03)
(c) Explain Gomberg reaction with suitable example. (03)