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(6th Semester)

CHEMISTRY

NINTH PAPER (CHEM-361)

(Organic Chemistry—III)*Full Marks : 55**Time : 2½ hours***(PART : A—OBJECTIVE)***(Marks : 20)**The figures in the margin indicate full marks for the questions*

SECTION—A

(Marks : 5)

Tick (✓) the correct answer in the brackets provided :

1×5=5

1. Phosphorescence is a relaxation from

- (a) triplet to a singlet state ()
- (b) singlet to a singlet state ()
- (c) triplet to a triplet state ()
- (d) None of the above ()

2. Diels-Alder reaction is

- (a) [2 2] cycloaddition reaction ()
- (b) [4 2] cycloaddition reaction ()
- (c) electrocyclic reaction ()
- (d) None of the above ()

3. Reaction of organolithium compounds with ketones in acid medium gives

- (a) aldehydes ()
- (b) amines ()
- (c) alcohols ()
- (d) carboxylic acids ()

4. Hofmann elimination is an example of
- (a) IR-assisted reaction ()
- (b) UV-assisted reaction ()
- (c) microwave-assisted reaction ()
- (d) All of the above ()
5. In ethanol, there are ____ different types of protons.
- (a) 2 () (b) 3 ()
- (c) 4 () (d) 5 ()

SECTION—B

(Marks : 15)

Answer the following questions :

3×5=15

1. Explain Norrish type-II cleavage.
2. Based on FMO method, discuss photo-induced cyclization of 1,4-dimethyl-1,3-butadiene.
3. Explain the advantage of organolithium compounds in hindered carbonyl groups with example.
4. Discuss Green method for Wittig reaction with suitable example.
5. Discuss the basic principle of NMR spectroscopy.

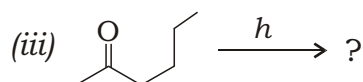
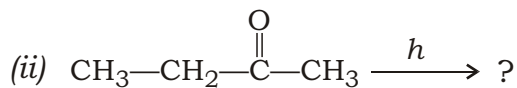
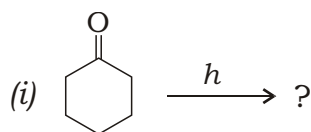
(PART : B—DESCRIPTIVE)

(Marks : 35)

The figures in the margin indicate full marks for the questions

1. (a) Discuss the following with suitable example : 3
 - (i) Paterno-Buchi reaction
 - (ii) Norrish type-I cleavage
 - (b) Explain Jablonski diagram. 3
 - (c) What is Franck-Condon principle? 1
- OR**
2. (a) Explain the following in brief : 4
 - (i) Singlet and triplet states
 - (ii) Quantum yield

(b) Complete the following reactions : 3



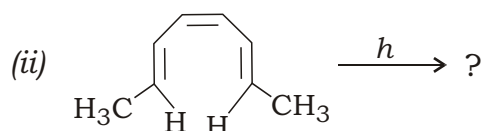
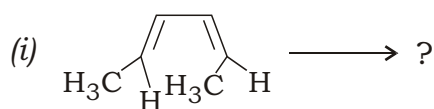
3. (a) Discuss the electrocyclic interconversion of cyclohexadiene-hexa-triene system using Woodward-Hofmann rule. 3

(b) Explain why $[\frac{2}{s} \quad \frac{2}{s}]$ cycloaddition reaction is thermally forbidden but photochemically allowed. 2

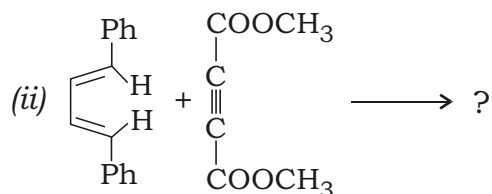
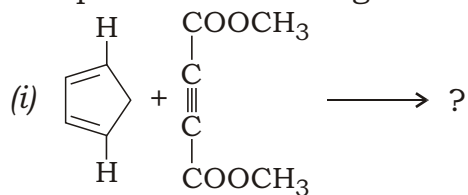
(c) What are dienes and dienophiles? 2

OR

4. (a) Give the product(s) with proper stereochemistry in the reactions below : 2×2=4



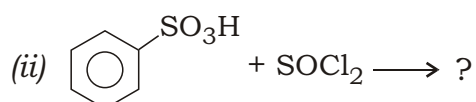
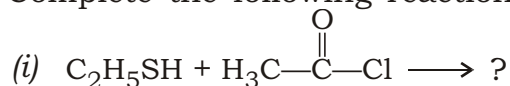
(b) Complete the following reactions : 1½×2=3



5. (a) Discuss the synthesis of the following with chemical reactions : $2 \times 2 = 4$
 (i) Thiol
 (ii) Sulphaguanidine
 (b) Write all the possible conformers of 1,3-disubstituted cyclohexane. Which conformer is the most stable and why? 3

OR

6. (a) Complete the following reactions : $1\frac{1}{2} \times 2 = 3$



- (b) What is conformation? Discuss 1,3-diaxial interaction in case of 1,3-dimethyl cyclohexane. 3
 (c) Write one preparation of thioether. 1
 7. (a) Write the mechanism for the Bayer-Villiger oxidation using suitable example. Discuss migratory aptitude. 3
 (b) Write the 12 basic principles of Green chemistry. 4

OR

8. (a) Discuss the preparation of butyraldehyde from Green preparation process. 3
 (b) Discuss Green method for aldol condensation with suitable example. 3
 (c) What is biochemical oxidation? 1
 9. (a) Explain the following in brief : $2 \times 2 = 4$
 (i) Metastable ion
 (ii) Chemical shift
 (b) Predict the chemical shift for acetaldehyde and acetophenone. 2
 (c) Sketch the ^1H NMR signal for toluene. 1

OR

10. (a) When 2-methylbutane is bombarded with high energy electron, it got fragmented and gave m/z values at 71, 57 and 43. Determine the fragmented structure. 3
 (b) Write a short note on shielding and deshielding in NMR spectra. 2
 (c) Discuss the ^1H NMR spectra of ethyl acetate with their chemical shift values. 2

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