SET A

B.Sc. CHEMISTRY
SIXTH SEMESTER
ORGANIC CHEMISTRY-IV
BSC – 603

[USE OMR FOR OBJECTIVE PART]

Duration: 1 hr 30 min. **Full Marks: 35**

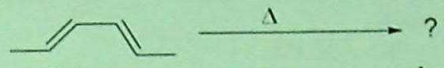
Objective

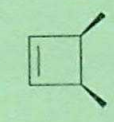
Time: 15 min. **Marks: 10**

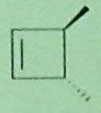
Choose the correct answer from the following: ***1×10=10***

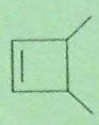
1. Which of the following statement is not correct?
   a. Electrocyclic reactions are pericyclic reactions
   b. Diels-Alder reaction is not a pericyclic reaction.
   c. Pericyclic reactions take place under photochemical or thermal conditions.
   d. A cyclic transition state is involved in a pericyclic reaction.

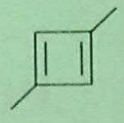
2. The product of the following electrocyclic ring closing reaction



a. 

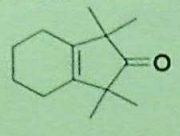
b. 

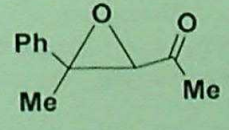
c. 

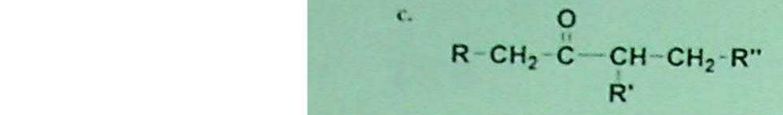
d. 

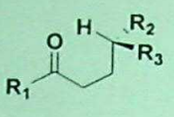
3. The exited state HOMO of 1, 3 – butadiene has
   a. Plane of symmetry
   b. Axis of symmetry
   c. Both a & b
   d. None of these

4. Which of the following transition is ISC transition?
   a. $S_0 \rightarrow S_1$
   b. $S_0 \rightarrow T_1$
   c. $S_1 \rightarrow T_1$
   d. $T_2 \rightarrow T_1$

5. Which of the following will undergo Norrish type II cleavage?
   a. 

   b. 

c. 

d. 

6. Which of the following is associated with the $n \rightarrow \pi^*$ transition?
   a. EtOH b. $EtNH_2$
   c. Et I d. $EtNO_2$

7. Which of the following transitions is associated with the least value of molar extinction coefficient (ε)?
   a. $\sigma \rightarrow \sigma^*$ b. $\pi \rightarrow \pi^*$
   c. $n \rightarrow \pi^*$ d. $n \rightarrow \sigma^*$

8. In FTIR, spectrum is generally represented as
   a. Volts *vs* time b. % Transmittance *vs* wave length
   c. Absorbance *vs* Concentration d. % Transmittance *vs* wavenumber

9. The wave numbers correspond to the wavelength 2.5 μm is
   a. 40 cm^{-1} b. 400 cm^{-1}
   c. 4000 cm^{-1} d. 40000 cm^{-1}

10. If a molecule (C_3H_5N) is showing a sharp peak at 2250 cm^{-1} in its FT-IR spectrum. The functional group present in the molecule will be
    a. $-NH_2$ b. -NHMe
    c. -CH=NH d. -CN

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Descriptive

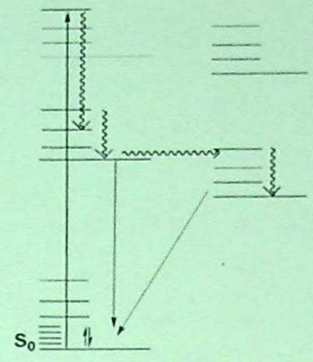
Time : 1 hr. 15 min. **Marks : 25**

[Answer question no.1 & any two (2) from the rest]

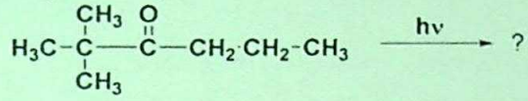
1. a. Schematically represent the S_0, S_1, S_2 and T_1 states of $\pi \rightarrow \pi^*$ electronic transitions in 1, 3 butadiene (CH_2=CH-CH=CH_2). **2+3=5**

   b. What is an auxochrome? Explain its impact on chromophore.

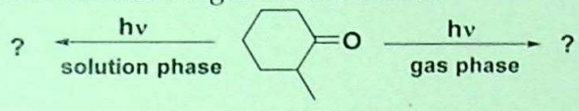
2. a. The following represents the Jabslonski diagram of electronic excitation and dissipation of energy. Give proper notations of different energy states, name the processes/phenomena represented in the diagram with proper explanation. **2+3+3+2 =10**



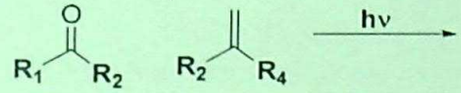
b. Give the possible products with mechanism.



c. Complete the following. Give mechanism.

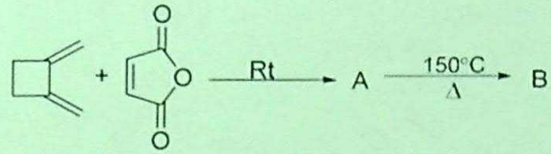


d. Write down the possible products with mechanism.

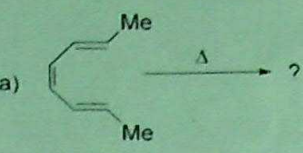


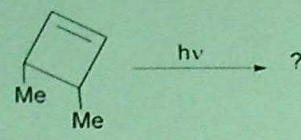
3. **a.** Define and classify pericyclic reactions? **2+3+3+2 =10**

b. Identify A and B in the following reactions.

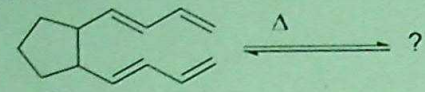


c. Write down the products for the following ring closing and ring opening electrocyclic reactions. Mention appropriate rotation (con/dis) for the same.

(a) 

(b) 

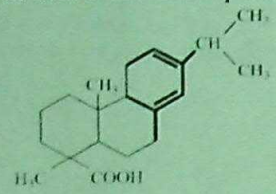
d. Write down the product and the order of the following sigmatropic reaction:



4. **a.** Discuss the effect of conjugation on electronic transition with suitable example. **4+3+3 =10**

b. Depict all the possible electronic transitions of acetone.

c. Calculate the expected λ_{max} of the given molecule.

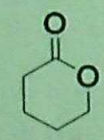


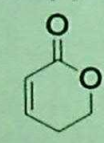
5. **a.** How many vibrational modes will be there for the following molecules? **3+2+3+2 =10**

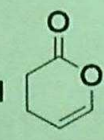
(i) Ethylene (ii) acetylene (iii) SO_2

b. Which vibrational mode of CO_2 is IR active? Explain.

c. Arrange the following molecules with decreasing order of C=O stretching frequency and justify your answer.

I 

II 

III 

d. Between ester and amide which one gives higher C=O stretching frequency?

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