This question paper contains **6** printed pages]

AY—113—2018

FACULTY OF SCIENCE

M.Sc. (First Year) (Second Semester) EXAMINATION

MARCH/APRIL, 2018

(CBCS Course)

CHEMISTRY

Paper II (CH-422)

(Organic Chemistry)

(Thursday, 12-4-2018) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *Hours* *Maximum Marks*—75

N.B. :— (*i*) Attempt *All* questions.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of logarithmic table and calculator is allowed.

(*iv*) Multiple Choice Questions (MCQs) should be attempted only once on Page No. 3 of answer-book with complete answer.

1. Attempt any *three* of the following : 15

(*a*) Explain the conformation of 1, 4-hexanediol.

(*b*) Define the sigmatropic rearrangement. Explain aza cope rearrangement with mechanism.

(*c*) Explain the following :

(*i*) Stobbe reaction

(*ii*) E^2-reaction.

(*d*) Explain the regioselectivity and chemoselectivity with suitable example.

(*e*) Discuss the stereochemistry of Spiranes and Allenes.

P.T.O.

2. Answer any *three* of the following : 15

(*a*) Explain cis-trans phenomena in Wittig reaction with example.

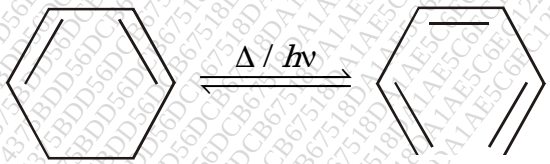
(*b*) Explain the stereochemistry of electrocyclic pyricyclic reaction for 4π system under heat by FMO method.

(*c*) What is Hydroboration ? Explain the regioselectivity of hydroboration with suitable example and mechanism.

(*d*) Draw correlation diagram for (4π + 2) cycloaddition reaction and explain why it is thermally allowed and photochemically symmetry forbidden.

(*e*) Explain with example of homotopic, distereotopic groups and faces.

3. (A) Illustrate the mechanism involved in the following electrocyclic pericyclic reaction by co-relation diagram method : 7



Or

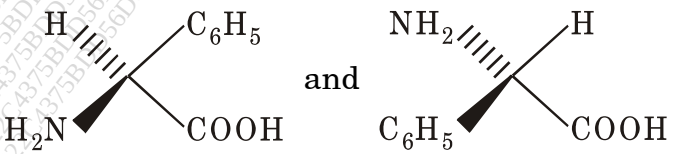
Give the synthesis and applications of the following :

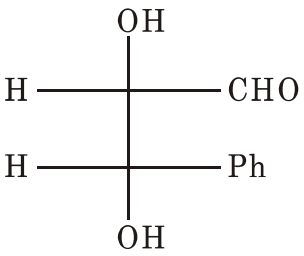
(*i*) Grignard reagent

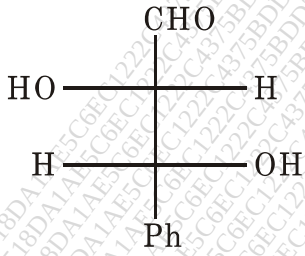
(*ii*) Organolithium reagent.

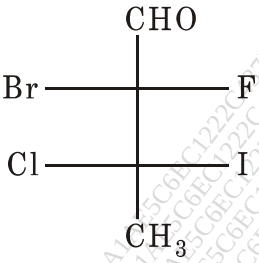
(B) Indicate whether the relationship in each pair of compounds below is identical, enantiomeric or diastereomeric by assigning R&S configuration and E&Z configuration : 8

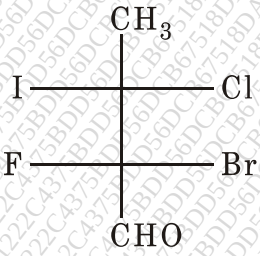
(*i*)

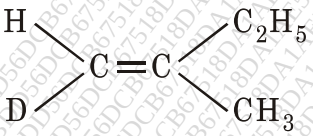


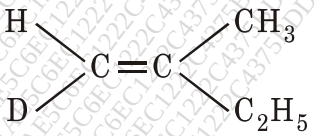
(*ii*) 

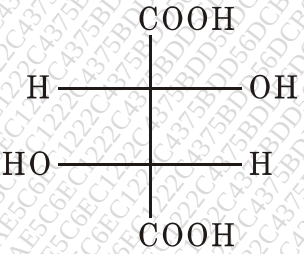
and 

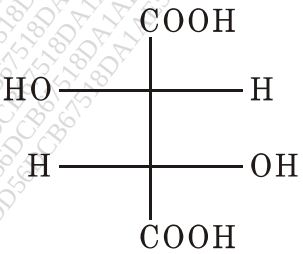
(*iii*) 

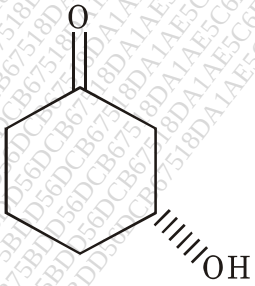
and 

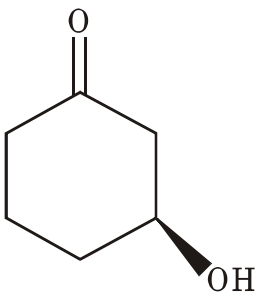
(*iv*) 

and 

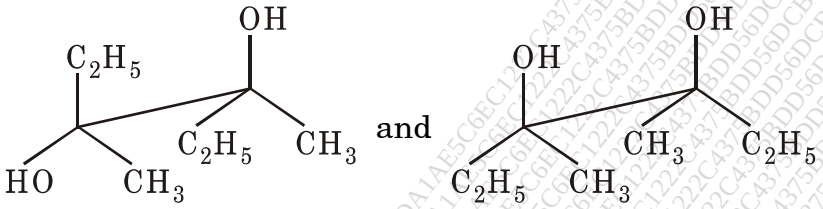
(*v*) 

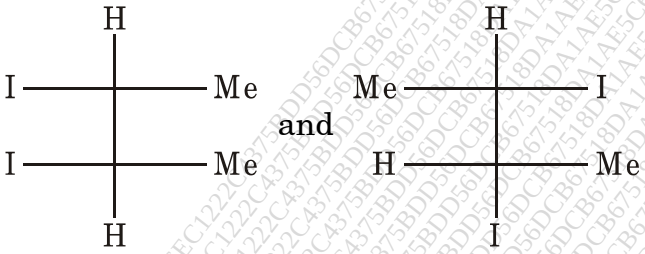
and 

(*vi*) 

and 

P.T.O.

(*vii*) 

(*viii*) 

4. (A) Explain the following reactions with mechanism : 7

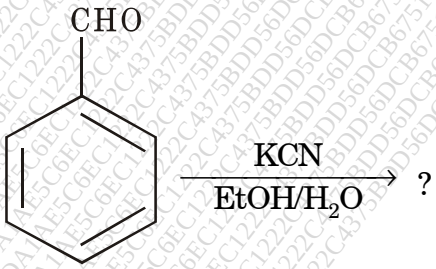
(*i*) Michael reaction

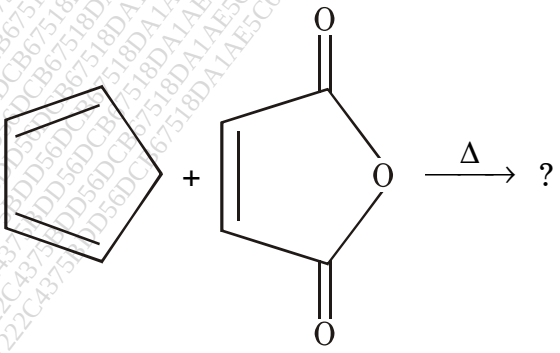
(*ii*) Mannich reaction.

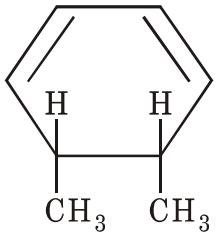
Or

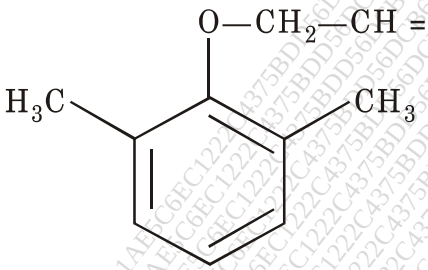
Explain the conformation of 1, 2 and 1, 3 dimethyl cyclohexane.

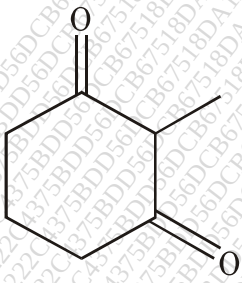
(B) Predict the product(s) with appropriate mechanism of the following (any *four*) : 8

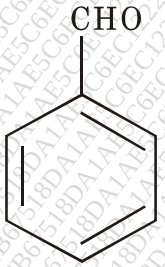
(*i*) 

(*ii*) 

(*iii*)  $\overset{\Delta}{\rightleftharpoons}$?

(*iv*)  $\xrightarrow{\Delta}$?

(*v*)  $+ CH_2 = CH—\overset{\overset{O}{\|}}{C}—CH_3 \xrightarrow[(ii)\ EtONa]{(i)\ CH_3O^{\ominus}K^{\oplus}}$?

(*vi*)  $+ Cl—CH_2—COOEt \xrightarrow[NaOEt]{PPh_3}$?

(*vii*) $\begin{matrix} Ph \\ \\ CH_3 \end{matrix}\!\!>\!C = O + Br—CH_2—COOEt \xrightarrow{Zn}$?

P.T.O.

5. (A) Select the *correct* answer from the given options for each of the following : 5

(*i*) Addition of Bromine to cis-2-butene gives :

(*a*) Mesoform

(*b*) *d*, *l*-pair of isomer

(*c*) Both (*a*) and (*b*)

(*d*) None of the above

(*ii*) The optically active allene among the following is :

(*a*) 1, 2-pentadiene

(*b*) 1, 2-butadiene

(*c*) 3-methyl but-1, 2-diene

(*d*) 2, 3-pentadiene

(*iii*) S_N1 reaction are ..... reaction.

(*a*) Stereospecific

(*b*) Stereoselective

(*c*) Both (*a*) and (*b*)

(*d*) None of the above

(*iv*) Reaction intermediate in E^2 reaction is :

(*a*) Carbanion

(*b*) Carbocation

(*c*) Benzene

(*d*) All of the above

(*v*) Photocycloaddition of $(4n + 2)\pi$ system process by :

(*a*) CON

(*b*) DIS

(*c*) C_2-axis symmetry

(*d*) None of the above

(B) Write short notes on any *two* of the following : 10

(*a*) 1, 3 dipolar cycloaddition reaction

(*b*) Benzoin condensation reaction

(*c*) [3, 3] sigmatropic rearrangement.