M.Sc. 4th Semester Examination, 2021

CHEMISTRY

(Organic Chemistry Special)

Paper : CHEM 402E

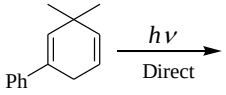
Course ID : 41452

Time: 2 Hours **Full Marks: 40**

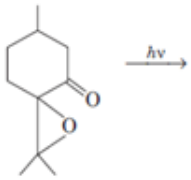
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as possible

1. Answer *any five* of the following questions: 2×5 = 10

(a) Complete the following reaction.



(b) Predict the product formed in the following reaction.



(c) Draw the stable conformation of IPC_2BH (Diisopinocampheylborane). Mention one limitation of this reagent in asymmetric hydroboration of an olefin.

(d) Explain enantiomeric excess (ee). Calculate the % of ee in a reaction where the ratio of enantiomer is 90:10.

(e) What are the basic differences between cationic and anionic micelles?

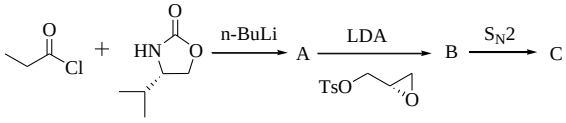
(f) Convert: 1-methylcyclohexene to *trans*-2-methylcyclohexanol.

Please Turn Over

(g) Mention reagents suitable for allylic oxidation of alkene and alcohol.

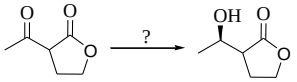
2. Answer *any four* of the following questions: 5×4 = 20

(a) Predict the products A to C in the following reaction sequence with suitable mechanism. Explain the selectivity, if any, involved.



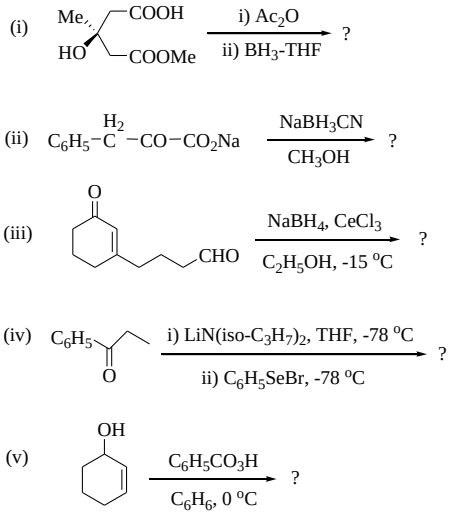
(1.5+1.5)+2 = 5

(b) Identify the missing reagents of the following reaction with plausible mechanism.



1+4 = 5

(c) Predict the products formed in each of the following reactions with explanation.



1+1+1+1+1 = 5

(d) Write short notes on (i) Norrish I (ii) Di-π-Methane (DPM) Rearrangement. 2.5×2 = 5

(e) (i) Mention reagents needed to oxidise the methyl group of acetone and toluene.

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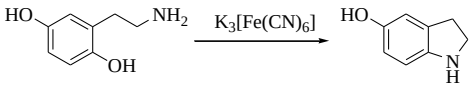
(ii) Rationalize the reaction:

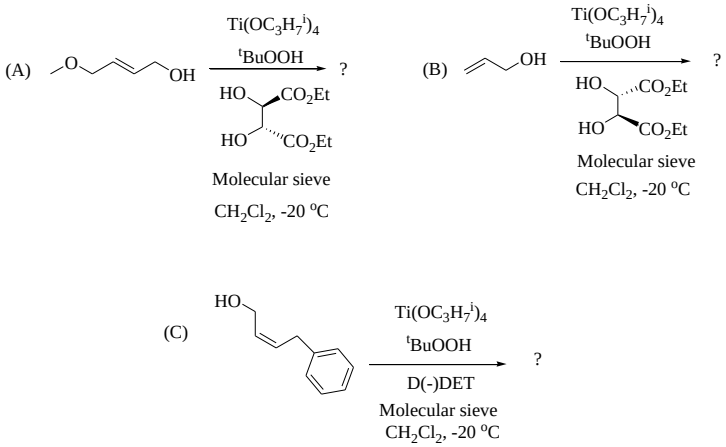


3+2 = 5

(f) Write short notes on liposomes and dendrimers. 2.5+2.5 = 5

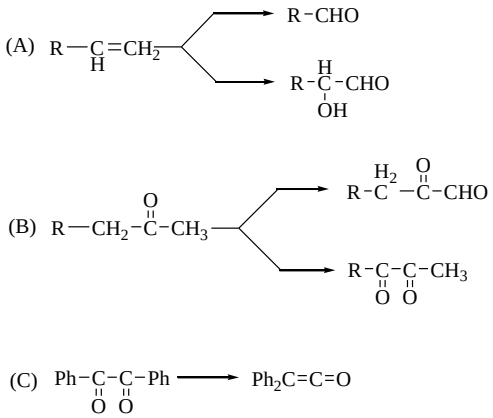
3. Answer *any one* of the following questions: 10×1 = 10

(a) (i) Give the stereochemistry of the major organic products formed in each of the following reactions.



(ii) Why molecular sieve is used in Sharpless asymmetric epoxidation (SAE) reaction? What is the major drawback of SAE reaction?

(iii) How would you carry out the following transformations?



3+(1+1)+(2+2+1) = 10

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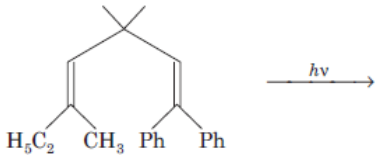
(b) (i) Predict the main product formed in the following reaction. Justify your choice.



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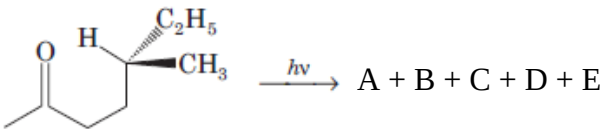
(ii) Write down the products (**A-E)** formed in the following reaction.



(iii) Describe the role of stabilizer or capping agent during the synthesis of nanomaterials by chemical route.

(1+2)+5+2 = 10