

2021
CHEMISTRY
(Organic Reactions and Mechanism)

Paper: 2.4

Full marks: 60

Time: 3 hr

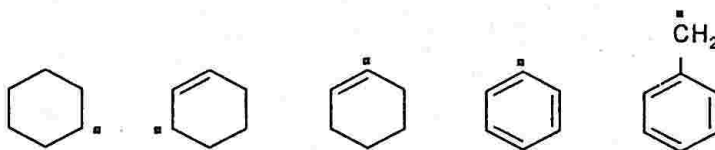
The figures in the margin indicate full marks for the questions

Answer all the questions

1. Answer the following questions:

1x5=5

- (a) Name one oxidizing agent which is specific for allylic and benzylic alcohols.
- (b) Arrange the following free radicals in increasing order of stability



- (c) What is Wilkinson's catalyst ?
- (d) Give reason why the quantum yield of Norrish type – I reaction is very low in inert solvent ?

Contd...

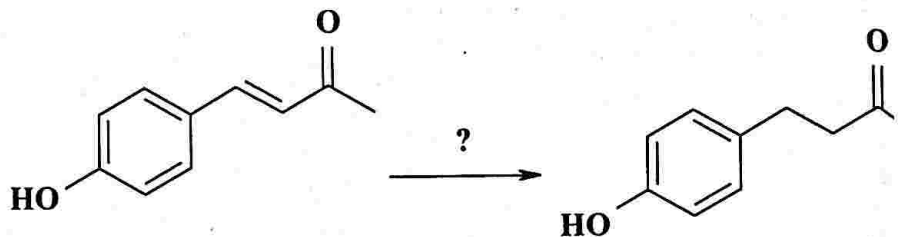
(e) What is the reason behind the stereospecificity of oxymercuration of an alkene ?

2. Answer *any five* questions:

3x5=15

(a) What is Adkin's catalyst ? Why the catalyst is mostly used in industrial methods ? Give an example to show that catalytic hydrogenation predominantly gives cis product.

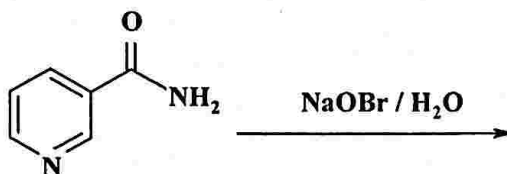
(b) What is Luche reduction ? Give an example to show its chemoselectivity. What should be the catalyst used in the following conversion ?



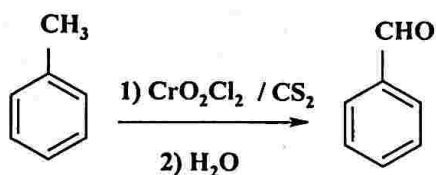
(c) What is Prilezhaev reaction ? Write the mechanism of the reaction with suitable example.

(d) Among benzene and furan which one is most likely to show Diels – Alder reaction and why ?

- (e) Write the product and suggest mechanism of the following reaction:



- (f) Write the mechanism of the following reaction:



- (g) How will you convert acetone to the respective oxetane ?
- (h) Explain the mechanism of 1,3 – dipolar addition with a suitable example.

3. Answer *any ten* of the following questions:

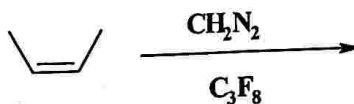
4x10=40

- (a) Explain Cope rearrangement. What is degenerate cope rearrangement? Under what condition the rearrangement becomes irreversible? What is the TS involved in Cope rearrangement?

1+1+1+1=4

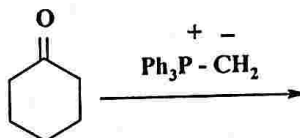
- (b) Complete the reaction and discuss the stereochemistry of the reaction:

2+2=4



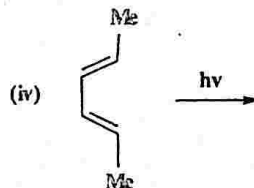
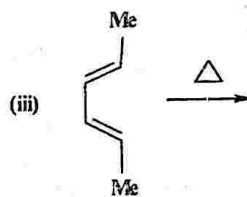
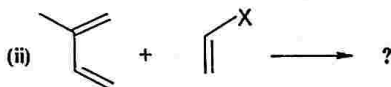
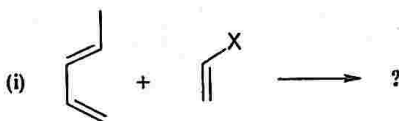
- (c) What are stabilized and non-stabilized ylides? Propose a mechanism of the following reaction:

2+2=4



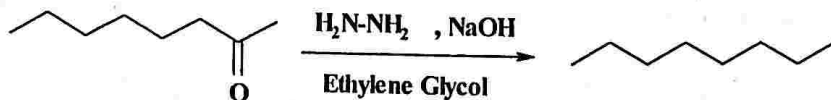
- (d) Write the possible product of the following reactions:

1+1+1+1=4

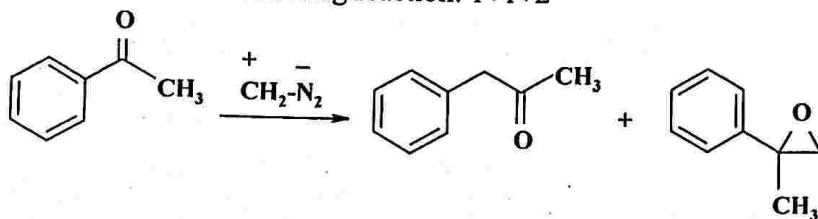


(c) How does tributyltinhydride convert a haloalkane to the respective alkane? Explain with suitable example.

(f) Write the mechanism of the following reaction:

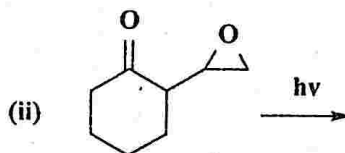
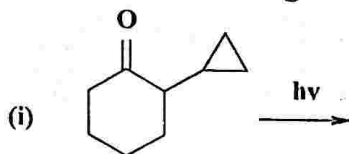


(g) What is Arndt-Eisterts synthesis? Give example. Write the mechanism of the following reaction: 1+1+2



(h) Complete the following reactions with mechanism:

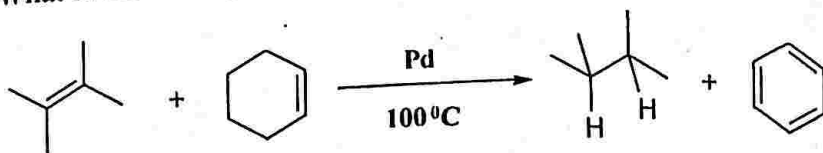
2+2



(i) How will you carry out the conversion of an alkene into a trans diol? Explain with suitable example.

(j) Hydroboration of propene is Markownikoff's regioselective. Explain with suitable example.

(k) How is diimide prepared ? Write the chemical reaction involved.
What is the driving force of the following conversion:



Can we use hydrazine in place of cyclohexene in the above reaction?

Give reason.

1+1+1+1

- (l) Explain the effect of electron releasing and electron withdrawing groups on the Birch reduction of benzene.
- (m) Migration of an alkyl group in the sigmatropic rearrangement is always suprafacial. Explain with suitable example.
- (n) How is PCC prepared ? What is the major disadvantage of the reagent ? Explain the mechanism of the reaction with suitable example.

