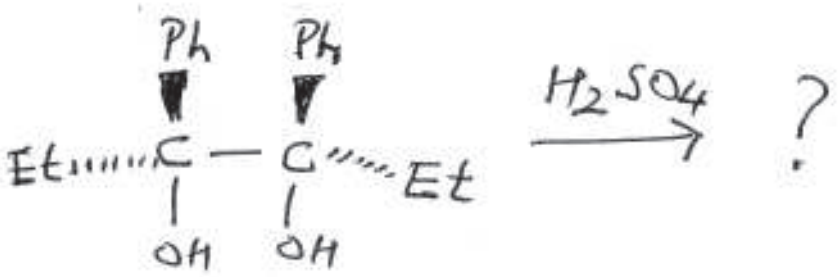
(REVISED COURSE) **QP Code : 20269**

[Time : 2½ Hours **[Total Marks : 75**

N.B : 1. **All** questions are **compulsory**.
2. Figures to the right indicate **full** marks.
3. Use of logtable / non-programmable calculator is allowed.

1. Answer any **three** of the following :—

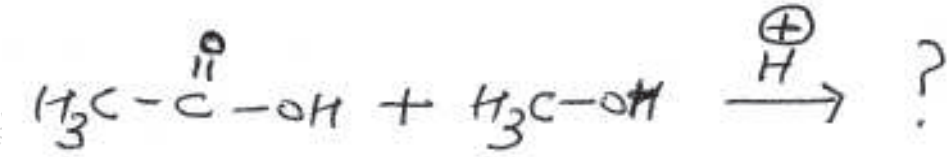
(A) Complete the following reaction, name the reaction involved and suggest a suitable mechanism. **5**



(B) (a) What is E_2 reaction ? Discuss its general mechanism. **3**
(b) Distinguish between transition state and intermediate. **2**

(C) What is Favorski rearrangement ? Give an example and explain its mechanism. **5**

(D) (a) Give the mechanism involved in the following reaction : **3**



(b) Explain Saytzeff elimination with an example. **2**

(E) (a) What is NGP effect ? What are its characteristics ? **3**
(b) Give the mechanism of Chugaev reaction. **2**

(F) (a) Suggest a suitable mechanism involved in the Wittig reaction. **3**
(b) What is Beckmann rearrangement ? Give an example. **2**

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

(A) (a) Draw structures of enantiomers of any one optically active allene. Why is it chiral without a stereogenic centre ? **3**
(b) Draw the twist-boat conformation of cyclohexane. Why is it more stable than the boat conformation ? **2**

(B) Draw the four chair conformations of 1-t-butyl-2-methylcyclohexane. Label the conformers appropriately and arrange them in the decreasing order of stability. **5**

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(C) (a) Explain, (i) enantiotopic ligands & (ii) diastereotopic faces, with suitable examples. **3**

(b) Considering planar structure of cyclopropane, calculate angle strain in the ring. **2**

(D) What are stereoselective organic reactions ? How are they classified ? Explain mechanism and stereochemistry of S_N^2 reactions involving fission of a bond at chiral carbon atom. **5**

(E) Explain the mechanism of bromination of olefins. Also explain the stereochemistry of bromination of cis and trans isomers of a suitable olefin. **5**

(F) (a) Explain the stereochemistry of catalytic hydrogenation of cis and trans isomers of a suitable olefin. **3**

(b) What is an alternating axis of symmetry ? Explain with a suitable example. **2**

3. Answer any **three** of the following :—

(A) With the help of a neat and labelled Jablonski diagram, explain the phenomenon of fluorescence. Giving a suitable reason, state whether it is an allowed or a forbidden transition ? **5**

(B) Explain photoreduction of benzophenone in a stepwise manner. **5**

(C) (a) How are the following compounds prepared using Grignard Reagent ? **3**

(i) 2 - Hexanol

(ii) Cyclohexyl methanol

(iii) Acetophenone

(b) Give the preparation of Iodomethyl zinc iodide. **2**

(D) Give one method for preparation of phenyl lithium ? **5**

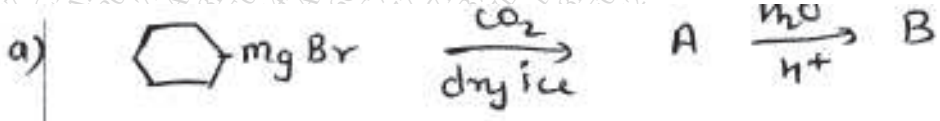
What is the action of the following on phenyl lithium ?

(i) Acetaldehyde

(ii) CO_2 (iii) Acetone

(E) Explain the mechanism and applications of Reformatsky reaction. **5**

(F) Complete the following reactions : **5**

a) 

b) $CH_3CH_2Li + CH_3OH \longrightarrow C$

c) $C_4H_9Li + CH_2-CH_2$ (O) $\xrightarrow{\text{hexane}} D \xrightarrow{H_2O} E$

d) $(CH_3)_2CuLi + CH_3CH_2CH_2I \xrightarrow{\text{hexane}} F$

e)  $+ CH_2I_2 \xrightarrow[\text{ether}]{Zn-Cu} G$

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4. Answer any **three** of the following

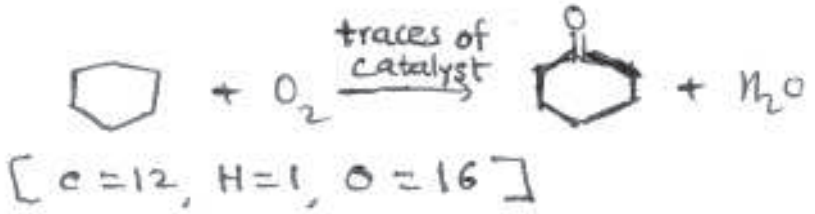
(A) Explain the following terms in synthetic organic chemistry : **5**

(a) Chemoselectivity (b) Diastereoselectivity

(B) Explain the retrosynthetic analysis of Salbutamol. Give the synthesis of Salbutamol. **5**

(C) (a) State and explain any three principles of Green chemistry. **3**

(b) Calculate atom economy for the following reaction. **2**



(D) Explain Merrifields's peptide synthesis. **5**

(E) Explain the use of the following in Green chemistry. **5**

(a) DES

(b) Dimethyl carbonate

(F) (a) Give the Green synthesis of paracetamol **3**

(b) Give two examples of microwave assisted organic synthesis. **2**

5. (A) State whether the following are true or false :— **4**

(a) Basicity is a thermodynamic property

(b) Anions have higher nucleophilicity than neutral molecules.

(c) Br^+ is less electrophilic than Br_2

(d) All 1, 2 eliminations take place through E_1 mechanism.

OR

(A) Fill in the blanks by selecting the correct answer :— **4**

(p) Benzilic acid rearrangement involves migration of aryl group to electron deficient _____
(Carbon, oxygen, nitrogen)

(q) Cope elimination is an example of _____ reaction.
(E_1, E_2, Ei)

(r) Dehydrohalogenation of 2 - bromobutane gives _____ as the major product.
(But-l-ene, But-2-ene, isobutylene)

(s) BAc^2 mechanism of ester hydrolysis involves _____ bond fission.
(alkyl - O, aryl - O, acyl - O)

(B) State whether the following are true or false :— **4**

(a) If a molecule and its mirror-image are non-superimposable, the molecule is chiral.

(b) Half-chair form is the most stable conformation of cyclohexane.

(c) All biphenyl compounds are optically active.

(d) All the compounds containing two or more chiral centres are optically active.

OR

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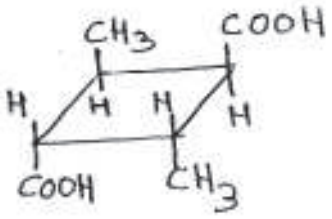
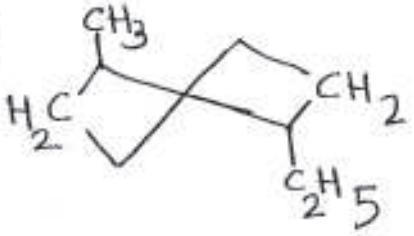
(B) State whether the following molecules are chiral or achiral. **4**

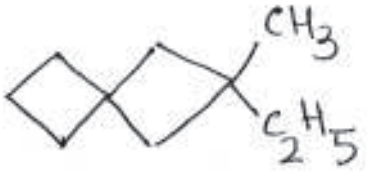
p)



q)



r)



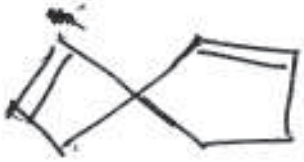
s)

(C) Give IUPAC name for each of the following compounds :— **4**

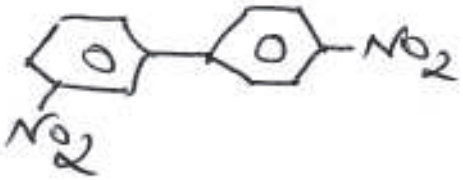
a) $C_6H_5CH=C=CHCH_3$

b)

c)



d)



OR

(C) Write the structural formula for each of the following compounds :— **4**

(p) Bicyclo [2.2.1] – 2, 5-heptadiene
(q) l –Bromo – 1, 2, 3 - pentatriene
(r) l - Nitro-5-methoxy spiro [3·4] octane
(s) 2, 3' - Diaminobiphenyl

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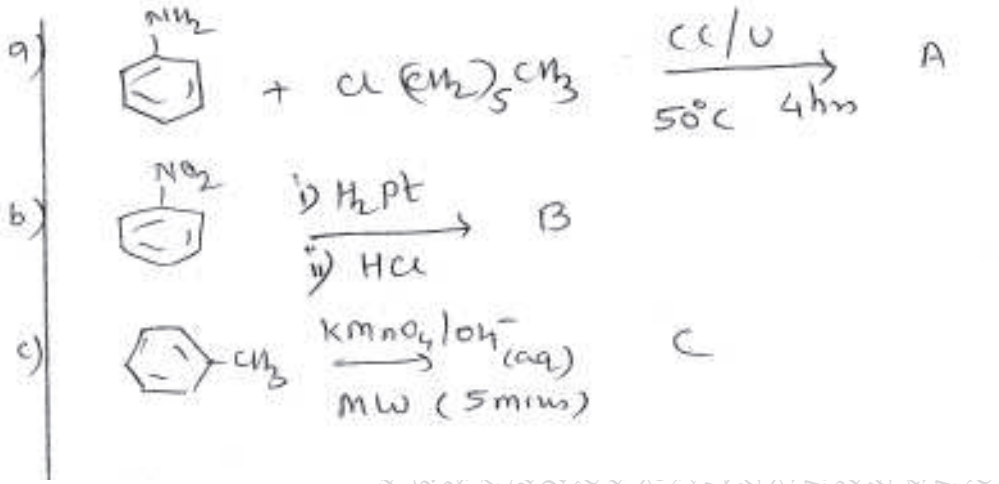
(D) Complete the following reactions. **3**



OR

(D) Match the column appropriately. **3**

Column A		Column B
(p) Heterogenous catalyst	(1)	methylene chloride
(q) Carcinogenic	(2)	DES
(r) Hazardous Bye products	(3)	Tellurium
	(4)	Cr & Mn compounds
	(5)	Supercritical CO_2