B.Sc I, sem III, CBSGS

Q.P. Code :32360

[Time: Three Hours] **[Marks:80]**

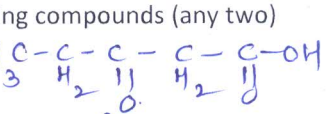
Please check whether you have got the right question paper.

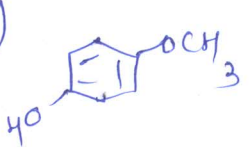
N.B: 1. .All Question are compulsory.
2. .Figures to right indicate full marks

Q.1 A) Answer the Following questions

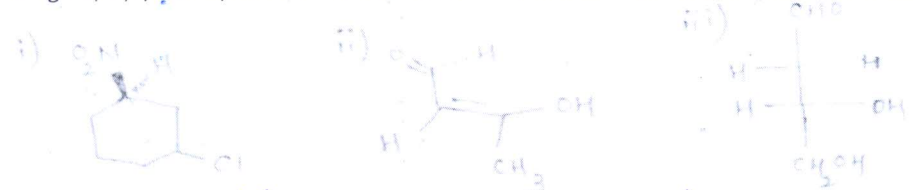
a) Give suitable structures for the following compounds (any two) 2 M

i) 3- oxopentanoic acid
ii)4- hydroxymethoxybenzene
iii)3-bromobutane-1-amine





b) Assign R/S ,E/Z or D/L Notation and Write nomenclature of following as per IUPAC rule (any two) 2 M



R-1-nitro-3-Chlorocyclohexane Z-3-hydroxybutenal. D-3,4-dihydroxy-butanal

c) Draw possible resonating structure for following compounds 2 M

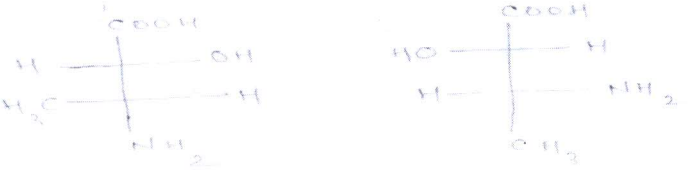
i) Bromobenzene ii)

d) Arrange the following in increasing order of acidity and justify 2 M

3 – chloropropionic acid, 2,2 – dichloropropionic acid, 2-chloropropionic acid

(3) (1) (2)

e) Establish relationship between following pair of the molecule 2 M



Diastereomer.
(R,R) (S,R)

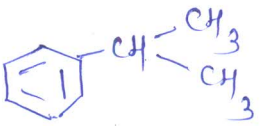
f) Arrange the following in the increasing order of basicity and justify 2 M

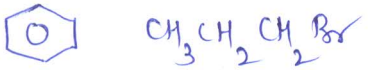
Aniline, p-nitroaniline, methylamine

(2) (3) (1)

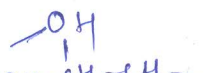
B) Give the product for the following reaction (any three) 3 M

i)Benzene +n-propyl bromide $\xrightarrow{AlCl_3}$





ii)Chlorobenzene $\xrightarrow{NaNH_2,\ liq\ NH_3}$ 

iii)Propene $\xrightarrow{Cl_2,\ H_2O}$ $CH_3CH=CH_2 \xrightarrow[H_2O]{Cl_2}$  (1,2)

iv)1,3-butadiene $\xrightarrow{Br_2}$ $CH_2=CH-CH=CH_2 \longrightarrow$ $CH_2=CH-CH-CH_2Br$ (1,4) $CH_2Br-CHBr-CH=CH_2Br$

Q2) A) • Give different types of tautomers with example. 2 M

B) Arrange the following carbanion in the increasing order of stability and justify. 1 M

 stability order $1^\circ > 2^\circ > 3^\circ$

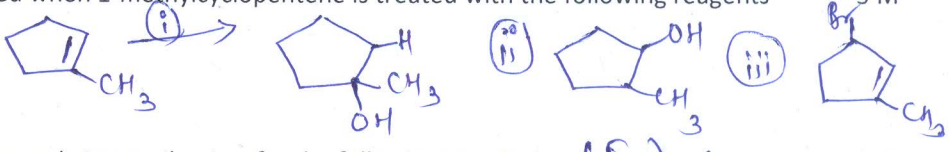
C) Write any two example of nucleophiles. CN^-, OH^-, $C_2H_5O^-$ 1 M

D) Give strcture of product expected when 1-methylcyclopentene is treated with the following reagents 3 M

i) Br_2, H_2O

ii) H_2SO_4, H_2O

iii) NBS



E) Identify product, type of reaction and give mechanism for the following reaction (E_2) elimination 4 M

$C_6H_5-CH_2-CH_2-Br \xrightarrow{alc.\ NaOH}$ $C_6H_5-CH=CH$

Q3) A) • Identify major product for the following reaction (SN^2) 4 M

$C_2H_5-CH_2-Br \xrightarrow{KOH,\ H_2O}$ $C_2H_5-CH_2-OH$

Discuss effect of the following factors on the above reaction

i)reactivity of alkyl halide, ii) nucleophile, iii) Solvent – polar aprotic DMSO / DMF / DMA

$1^\circ > 2^\circ > 3^\circ$ OH^-

B) • Explain following terms with the suitable example (any three) 3 M

i)Racemic mixture, ii) Enantiomers, iii) Meso compounds, iv) Atropisomerism

C) • Write all the possible geometric isomers of the following compound 2 M

$CH_3-CH_2-CH=CH-CH=C(CH_3)C_2H_5$ – 4 structures should be written

D) • Suggest suitable method for resolution of basic racemic mixture 2 M

Q4) A) Discuss orientation and reactivity of NH_2 substituent towards electrophilic aromatic substitution reaction 2 M

↳ O/p directing & activating. – M&B - Pg 273

B) Explain mechanism involved in the nitration of benzene 2 M

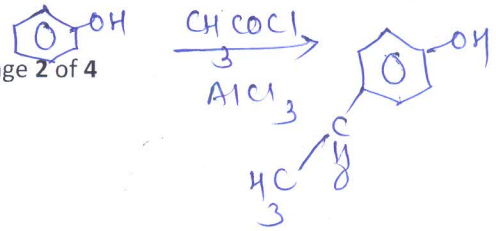
~~M&B~~ – M&B - 246 & 270.

C) Convert the following (any three) 3 M

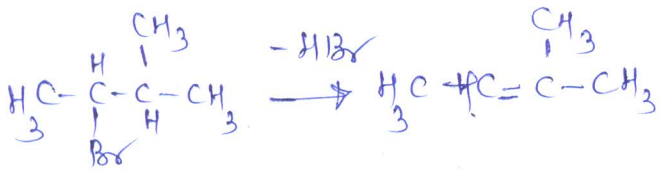
i) 1-butene to 1-cyclopropylethane Simmonsmith $CH_3CH_2CH=CH_2 \xrightarrow{CH_2I_2} CH_3CH_2-CH-CH_2$

ii) Propene to propyne

iii) Phenol to p-hydroxyacetophenone

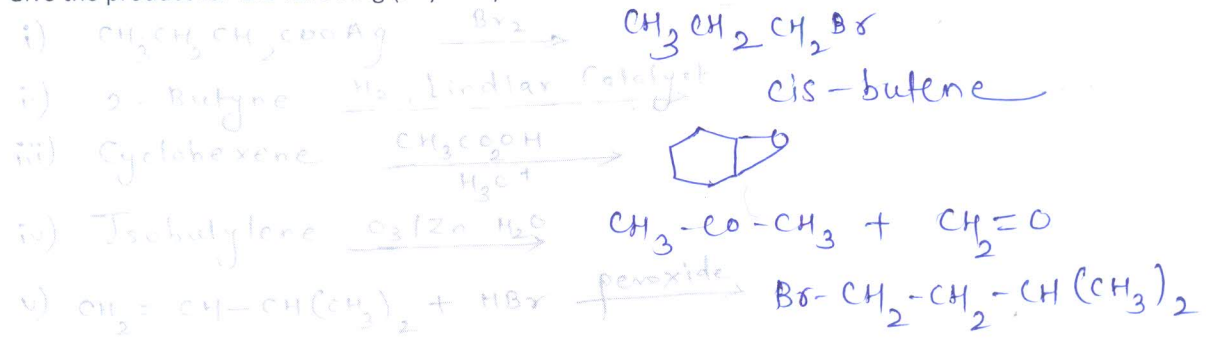
 F.C. acylation.

(PTO)

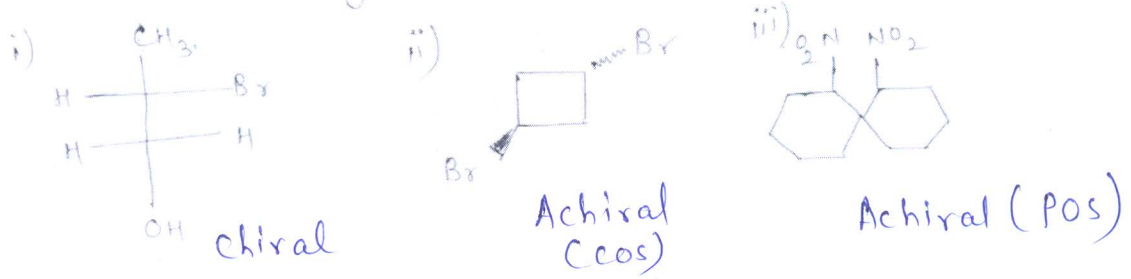


iv) 3-bromo-2-methylbutane to 2-methyl-2-butene

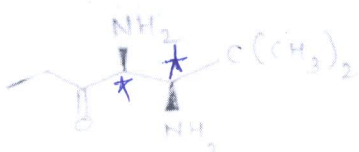
D) Give the product for the following (any four) 4M



Q5) A) Identify the following molecules are chiral or achiral. Justify 3 M

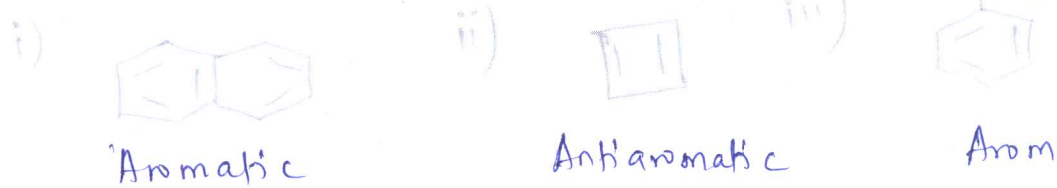


B) Identify assymetric center in the following molecules 1 M



C) State Huckel Rule for the aromaticity. Identify if the following molecules are aromatic, antiaromatic or non-aromatic 4M

$4n+2 = \pi$ e⁻

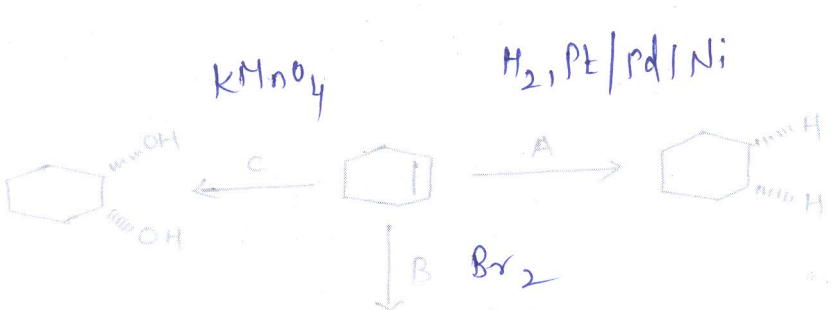


D) Explain elimination-addition mechanism for aromatic nucleophilic substitution reaction MRB-497 – 3 M

Q6) A) Explain orientation of product formation when 1-propene reacts with Br_2 $CH_3CH=CH_2 + Br_2$ 2 M

B) Define and discuss with example concept of stereospecific and stereoselective reaction – Anti addition 2M

C) Identify following reagents $CH_3-\underset{Br}{CH}-\underset{Br}{CH_2}$ 3 M



D) Predict the product for the following (any four) 4 M

i) $\ce{Ph3P}$, $\ce{CH3Br}$ → $CH_3-CH=CH-CH_3$

ii) B_2H_6, H_2O_2 → $CH_3CH_2CH_2OH$

iii) $CH_3-C\equiv CH$ + Cl_2 → $CH_3CHCl=CHCl$ + Cl_2 → $CH_3-CCl_2-CHCl_2$

iv) $CH_3-CH_2=CH_2$ + H_2O, H^+ → $CH_3-CH(OH)-CH_3$

v) $2\,CH_3I$ + Na, ether → CH_3-CH_3

Q.4) c) ii)

$CH_3CH=CH_2 \xrightarrow{Br_2} CH_3-CH(Br)-CH_2(Br) \xrightarrow[alc]{KOH} CH_3CH=CHBr \xrightarrow{NaNH_2} CH_3-C\equiv CH$