chem

QP Code : 12884

(2 ½ Hours) **[Total Marks : 75**

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

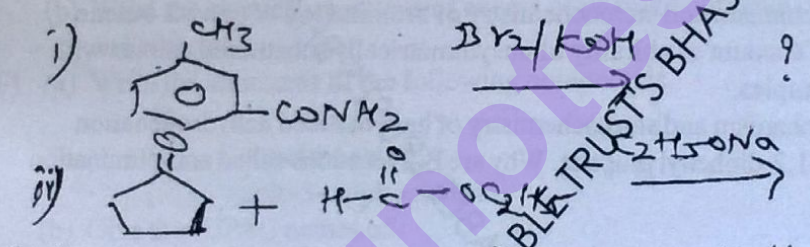
1. Answer **any three** of the following :- 5

(A) What is Pinacol-pinacolone rearrangement? Give an example and suggest a suitable mechanism.

(B) (a) What are kinetically controlled reactions? Explain with any two suitable examples. 3

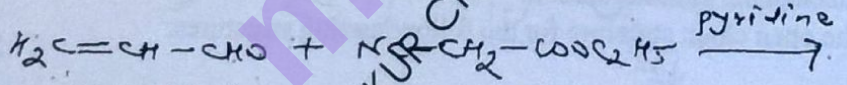
(b) State and explain Hofmann rule of elimination. 2

(C) (a) Write the products formed in the following reactions and name the reaction involved :- 3



(b) Explain nucleophilicity with a suitable example. 2

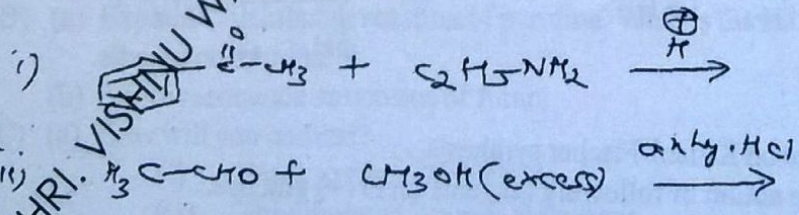
(D) (a) Give the mechanism involved in the following reaction. 3



(b) Explain the stereochemistry of Beckmann rearrangement with a suitable example. 2

(E) (a) What is E1 reaction? Discuss its mechanism. 3

(b) Complete the following reactions 2



(F) (a) Give the mechanism involved in the acid catalysed esterification of alcohol. 3

(b) What is Benzilic acid rearrangement? Give an example. 2

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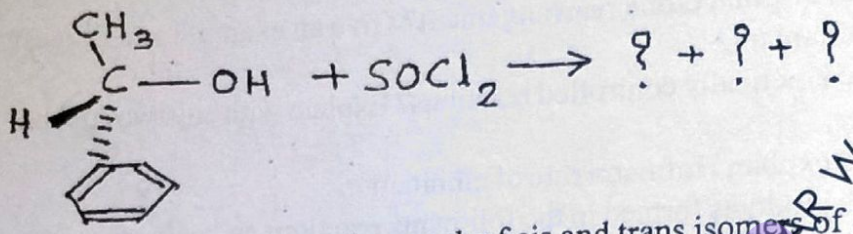
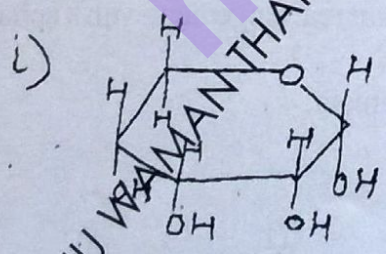
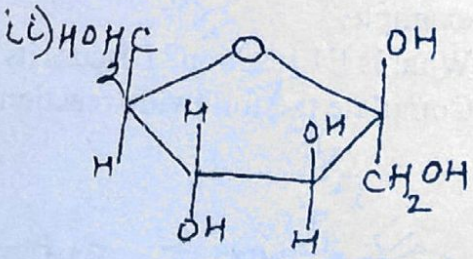
2. Answer **any three** of the following
   (A) Explain the concept of 'angle strain'in cycloalkanes. Calculate angle strain in cyclopropane, cyclobutane and cyclopentane, considering their planar structures. 5
   (B) Complete the following reaction. Explain its S_Ni- mechanism and stereochemistry.



   (C) Draw two chair conformations each of cis and trans isomers of 1, 3, - diethylcyclohexane. Which of the four conformers is more stable? Why? 5
   (D) Explain mechanism and stereochemistry of bromination of trans-2-butene. 5
   (E) Give a brief account of chirality of unsymmetrically substituted spirans with suitable examples.
   (F) Explain mechanism and stereochemistry of base induced dehydrogenation of 1-bromo-1,2-diphenyl propane. Why are E-2 reactions called anti-elimination reactions? 5

3. Answer **any three** of the following
   (A) (a) What are monosaccharides? Explain the importance of amphiprotic solvent in the mechanism of mutarotation. 3
   (b) Write the open chain structure for the following ring structures. 2





   (B) (a) Write a note on Kiliani-Fischer synthesis. 3
   (b) What is the action of following reagents on D (+) glucose. 2
   (a) conc. HNO_3 (b) H_2/Ni
   (C) (a) What are epimers and anomers? Give examples 3
   (b) How will you convert D(+) glucose to D (-) arabinose? 2

(D) (a) Assuming configuration of D (+) glucose derive the configuration of D (-) fructose. 3

(b) Complete the following reactions. 2

i) D(+) glucose $\xrightarrow{\text{Bromine water}}$?

ii) α-D fructopyranose $\xrightarrow{CH_3OH/Dry\ HCl}$?

(E) (a) Explain : glucose is a reducing sugar whereas sucrose is a non reducing sugar. What is the action of HIO_4 on glucose? 3

(b) Write the stepwise reactions of excess of phenyl hydrazine on glucose and fructose. 2

(F) (a) Write the structures of the following compounds: 3

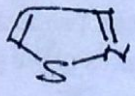
(i) 1, 3 - oxazole

(ii) 2 - methyl azine

(iii) oxole-3-sulphonic acid.

(b) Give the IUPAC names of : 2

i) 

ii) 

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

(A) (a) Explain Hofmann exhaustive methylation & elimination reaction with piperidine. 3

(b) Write Paal-Knorr synthesis for preparation of pyrrole. 2

(B) (a) Explain Chichibabin reaction of pyridine. What is the action of sodium in ethanol on pyridine? 3

(b) Write resonance structures of furan. 2

(C) (a) How will you convert? 3

(i) Furan to furan-2-aldehyde

(ii) Thiophene to 2-acetyl thiophene

(iii) Pyrrole to Tetrabromopyrrole.

(b) Discuss the aromaticity of pyridine. 2

(D) Explain 'multicomponent synthesis' with any two examples. 5

(E) Write synthesis of the following:- 5

(a) Indigo from anthranilic acid.

(b) Green synthesis of paracetamol.

(F) Explain the use of microwaves in organic synthesis with any two examples. 5

5. (A) Choose the right answer from the alternatives given below and rewrite the completed statements.

(a) Lewis acids exhibit _____

(nucleophilicity, basicity, electrophilicity)

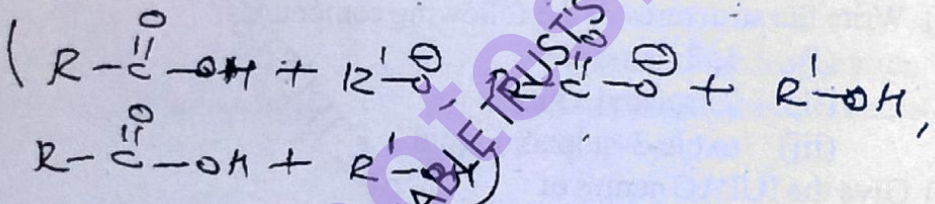
(b) Saytzeff elimination of alkyl halide forms _____ olefin as the major product.

(least substituted, unsubstituted, most substituted)

(c) Sulphonation of naphthalene at 160°C given a mixture of _____

(80 % α-isomer + 20% - β isomer, 20% α - isomer + 80% - β isomer, 60% α isomer+ 40% - β isomer)

(d) In the alkaline hydrolysis of an ester, the end products are _____



OR

(A) State whether the following statements are **true** or **false** :- 4

(p) Basicity is a kinetic property.

(q) E2 elimination takes place preferably from the syn-periplanar conformation.

(r) Anions have higher nucleophilicity than neutral molecules.

(s) Claisen Condensation is a self- condensation of esters without α-hydrogen atom.

(B) Fill in the blanks. 4

(a) In S_N2 reactions, a dextrorotatory substrate gives a _____product.

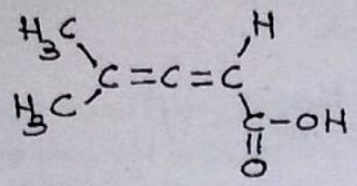
(b) In S_N1 reactions, a levorotatory substrate normally gives a _____product.

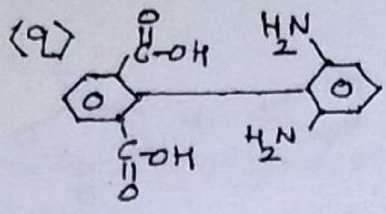
(c) In syn-hydroxylation, a trans substrate gives a _____product.

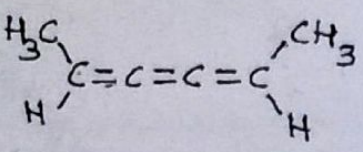
(d) In catalytic hydrogenation, a cis substrate gives a _____product.

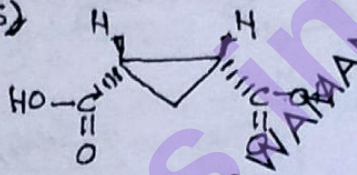
OR

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

(P) 

(Q) 

(R) 

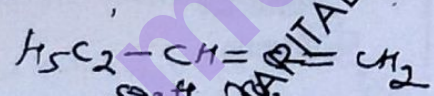
(S) 

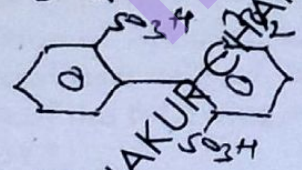
(C) Write the structures of the following compounds. 4

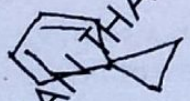
(a) 1-bromo-1,2 -pentadiene
(b) 6- bromospiro [3, 5] nonane
(c) 2, 4 - diaminodiphenyl
(d) 3-methylbicyclo [4,2,0] octane

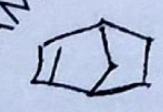
OR

(C) Give the IU PAC names of the following components : 4

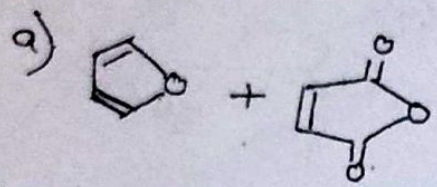
P) 

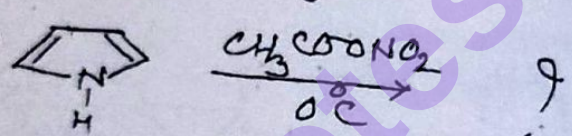
Q) 

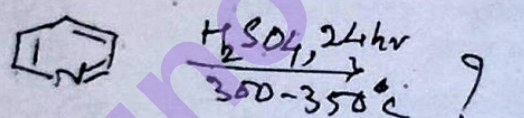
R) 

S) 

(D) Complete the following reactions:- 3

a) 

b) 

c) 

OR

(D) Match the columns appropriately :- 3

Compounds	Uses
(p) Bifenox I	Hormone
(q) Norfloxacin	Vat dye
(r) L-ascorbic acid	Antibiotic
	Herbicide
	Vitamin
