

Test Examination-2019
Raiganj Surendranath Mahavidyalaya
B.Sc Part-III Honours
Subject: CHEMISTRY
Paper-IX (Organic)
F.M.-65, Time-3 Hours

Paper Code : IX-A

Full Marks: 15

Time: 30 min.

Answer all the questions

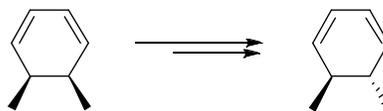
1. Choose the right one in the following MCQ question (15 x 1)
- (a) Which of the following reagents are used in Sharpless asymmetric epoxidation
(I) $\text{Ti}(\text{OPr})_4$ (II) *t*-BuOOH (III) (+) DET (IV) All of these
- (b) Which of the following disachharide is non-reducing in nature
(I) Lactose (II) Maltose (III) Sucrose (IV) None of them
- (c) Biuret test will be given by
(I) Dipeptide (II) Tripeptide (III) Tetrapeptide (IV) None of these
- (d) Pomeranz Fritsch synthesis is used for the preparation of
(I) Indole (II) Quinoline (III) Isoquinoline (IV) Furan
- (e) Which polymer is formed using adipic acid as a monomer?
(I) Terylene (II) Nylon 66 (III) Polystyrene (IV) Teflon
- (f) Enol contained is least in which of the following compound
(I) EAA (II) $(\text{Me}_3\text{CO})_3\text{CH}$ (III) Acetylacetone (IV) α -phenyl EAA
- (g) How many ^1H NMR signals are found in 1,2-dichloro cyclohexane and 1,4-dichloro cyclohexane?
(I) 2,3 (II) 3,2 (III) 3,1 (IV) 2,1
- (h) $\nu_{\text{C=O}}$ stretching value is max for which of the following compound
(I) $\text{RCH}=\text{C}=\text{O}$ (II) RCONH_2 (III) RCOCl (IV) RCOOH
- (i) The preferred conformation of *cis*-1,4-di-*tert* butyl cyclohexane
(I) Chair (II) Half chair (III) Boat (IV) Twist boat
- (j) Which of the following pair is not epimer
(I) D-glucose & D-mannose (II) D-glucose & D-galactose (III) D-arabinose & D-ribose (IV) α -D-glucose & β -D-glucose
- (k) Cyclic Model and Crams model give same product when OH gr. connected to chiral carbon in a ketone is
(I) Small gr. (II) Medium gr. (III) Large gr. (IV) None of These
- (l) Malachite green is an example of
(I) Anthraquinonoid Dye (II) Azo dye (III) Triphenylmethane dye (IV) Mordant dye
- (m) The λ_{max} value will be maximum for
(I) Cyclohexane (II) Cyclopropane (III) Cyclobutane (IV) Cyclodecane
- (n) Cope rearrangement is shown by which of the following diene
(I) 1,4 (II) 1,5 (III) 1,3 (IV) 1,6
- (o) Chose the figure print region in IR Spectroscopy
(I) $4000\text{-}3000\text{ cm}^{-1}$ (II) $2000\text{-}1500\text{ cm}^{-1}$ (III) $1400\text{-}900\text{ cm}^{-1}$ (IV) $1700\text{-}1000\text{ cm}^{-1}$

Answer any **five** questions taking *at least two* from each group

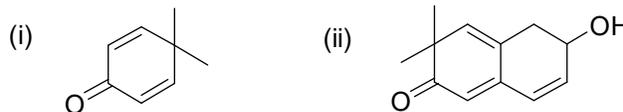
Group - A

- (a) Explain the change in nature of ^1H NMR spectrum of CH_3OH when experiments are carried out with neat liquid at 30°C and at -45°C . 1
- (b) Distinguish between the following compounds : 2
 - p -hydroxybenzaldehyde & salicylaldehyde --- using IR
 - Phenol & p -nitrophenol --- using UV
- (c) Convert: p -methoxybenzaldehyde \longrightarrow 6-methoxyisoquinoline 2
- (d) 1,3,5-hexatriene - cyclohexadiene inter-conversion will occur by disrotatory mode under thermal condition --- Explain using Orbital symmetry conservation theory. 3
- (e) Bromine water oxidation of α -anomer of D-glucopyranose is 250 times slower than the β -anomer --- Explain. 2

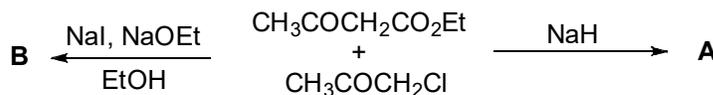
2. (a) How can you carry out the following conversion:



- E, F, G - are three aldohexoses. E & F yield sorbitol when they are catalytically hydrogenated but yield different osazones when treated with excess phenylhydrazine. Whereas, F & G give same osazone, but yield different alditols. Assuming that F & G are D-aldohexoses give the structures of E, F, G. 3
- (c) Calculate the λ_{max} values : 2



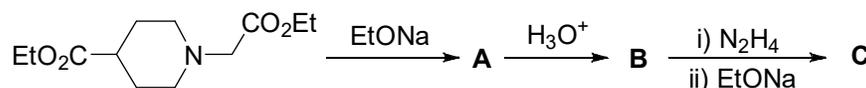
(d) Identify A & B with justification: 3



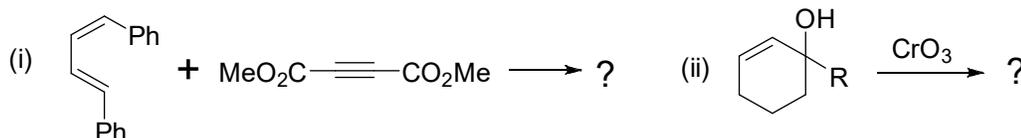
- (a) When propane is subjected to free radical chlorination in the ratio $\text{C}_3\text{H}_8 : \text{Cl}_2 = 1:2$, it gives a mixture of isomeric compounds A,B,C,D. The ^1H NMR of these compounds are given. Deduce the structures of A, B, C, D. 3

Isomers--- A: δ 2.4(s, 6H); B: δ 1.2(t, 3H), 1.9 (quintet, 2H), 5.8 (t, 1H);
 C: δ 1.4(d, 3H), 3.8(d, 2H), 4.3(m, 1H); D: δ 2.2 (quintet, 2H), 3.7 (t, 4H)

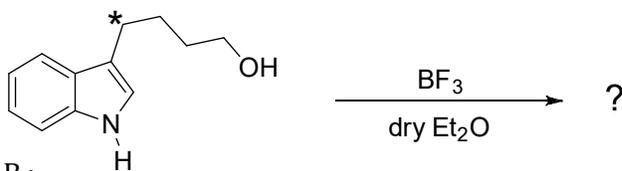
(b) Identify A, B, C : 3



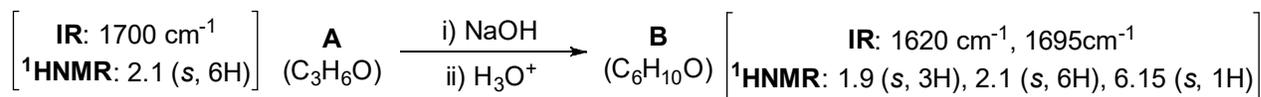
(c) Predict the products with suitable mechanism : 2 x 2 = 4



4. (a) What products can you expect from Killani- Fischer synthesis of D - glyceraldehyde? Can you distinguish their configuration by carrying out any simple reaction? 2+1
 (b) Why is periodic acid, rather than leadtetraacetate, is used for oxidative cleavage of carbohydrate? 1
 (c) Predict the outcome of the following reaction: 2



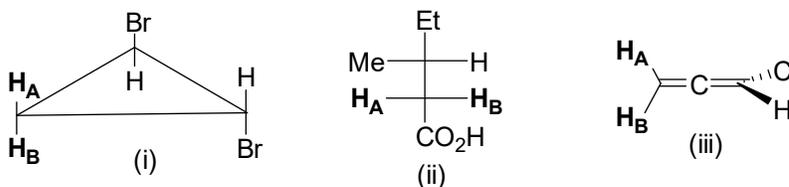
- (d) Predict the structures of A & B : 2



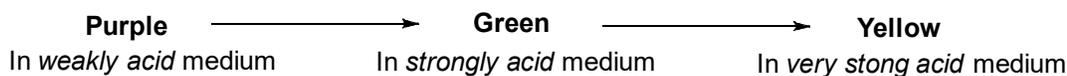
- (e) **Convert:** *o*-aminophenol \longrightarrow 8-hydroxyquinoline 2

Group - B

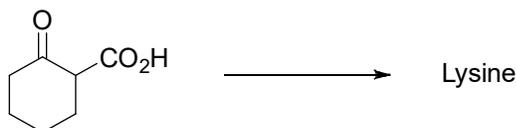
5. (a) What is Sanger reagent? How is it used to determine the *N*-terminal amino acid in peptide molecule? Give necessary reactions with mechanism. 1+2
 (b) How can you synthesize the following compounds: 2+2
 (i) 4-methylpentan-2-one from EAA (ii) 2,3- dimethylbutanoic acid from DEM
 (c) Identify the topic relationship between **H_A** & **H_B** in the following compounds: 3 x 1



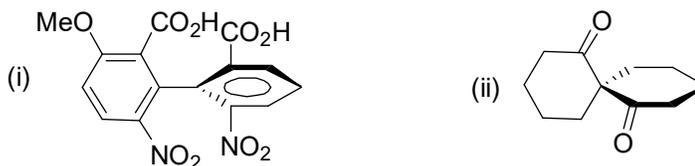
6. (a) Design the synthesis of crystal violet from phosgene & *N,N*-dimethylaniline. The colour of crystal violet changes depending upon pH of the solution as follows; Explain this phenomena: 2+2



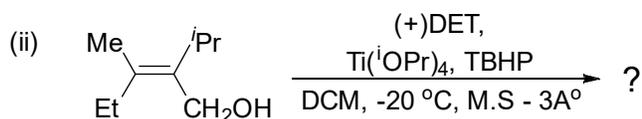
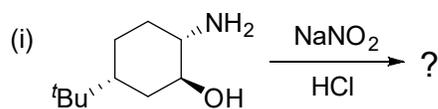
- (b) Convert: 2



- (c) Designate R/S to the following compounds. What kind of isomerism is this and what kind of chirality is responsible for this kind of isomerism? 1+1+1+1

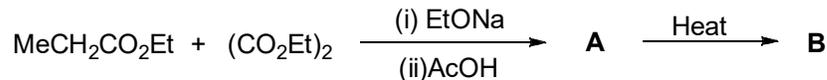


7. (a) Synthesize 3-methylpentan-2-ol starting from EAA. 2
 (b) How can you prepare tyrosine specifically labelled with ^{14}C at the carbon atom of carboxylic acid? 2
 (c) Predict the products with justification: 2+2



- (d) Predict the products: 1+1
 (i) Diazotised 3-NH₂-4-OH-benzenesulphonic acid + *m*-phenylenediamine \longrightarrow ?
 (ii) Benzenediazoniumchloride + resorcinol \longrightarrow ?

8. (a) What is meant by specific base-pairing in a double helix structure of a DNA molecule? Why has other base pairings not observed in a DNA double helix structure? 2+2
 (b) Predict A & B and provide suitable mechanism in support: 2



- (c) How can you synthesize the following: 2+2

