Mock Test Question
B.Sc Part-III Honours
Subject: CHEMISTRY
Paper-IX (Organic)
F.M.-50, Time-2 Hours

(Answer Q. No.1 and any two from Gr.A and Gr.B)

1. Choose the right one in the following MCQ question **(10 x 1)**

(a) Which of the following compound act as best diene in Diels Alder reaction.
(I) 1,3-butadiene **(II) Benzyne** **(II) Isoprene** **(IV) Cyclopentadiene**

(b) Which of the following disachharide is non-reducing in nature
(I) Lactose **(II) Maltose** **(II) Sucrose** **(IV) None of them**

(c) α-amino nitrile is involved in
(I) Curtius rexn **(II) Gabriel rexn** **(II) Strecker rexn** **(IV) Koop synthesis**

(d) Friedlander synthesis is used for the preparation of
(I) Indole **(II) Quinoline** **(II) Isoquinoline** **(IV) Furan**

(e) Which polymer is formed using ethylene glycol as a monomer?
(I) Terylene **(II) Nylon 66** **(II) Polystyrene** **(IV) Polythene**

(f) Enol contained is more in which of the following compound
(I) EAA **(II) DEM** **(II) Acetylacetone** **(IV) α-phenyl EAA**

(g) How many ^{1}H NMR signals are found in *cis* and *trans* 1,2-dimethyl cyclopropane?
(I) 2,3 **(II) 3,4** **(II) 1,2** **(IV) 8,10**

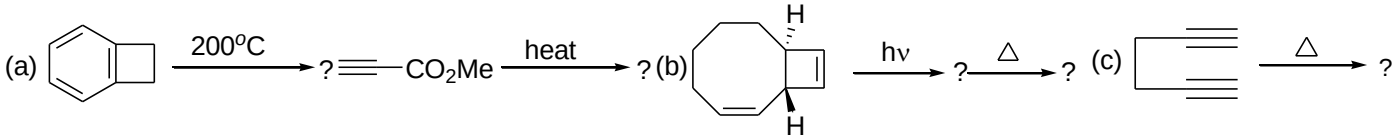
(h) ν_{co} stretching value is max for which of the following compound
(I) RCH=C=O **(II) $RCONH_2$** **(II) RCOCl** **(IV) O=C=O**

(i) The preferred conformation of cyclohexane *cis*-1,4-diol is
(I) Chair **(II) Half chair** **(II) Boat** **(IV) Twist boat**

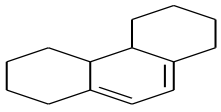
(j) Which of the following pair is not epimer
(I) D-glucose & D-mannose **(II) D-glucose & D-galactose** **(II) D-arabinose & D-glucose** **(IV) α-D-glucose & β-D-glucose**

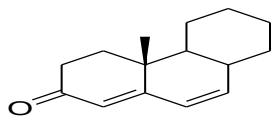
Group-A

2. (a) Endo product predominates over exo products in Diels Alder reaction between cyclopentadiene and maleic anhydride although it is sterically more hindered. (b) Predict the product with stereochemistry. **[2+(3+3+2)]**



3. (a) Draw the NMR spectra of ordinary ethanol. (b) An aliphatic hydrocarbon '**A**' (M.F. C_3H_4) on thermal catalytic trimerization, affords '**B**', which in its ^{1}H NMR spectrum gives two singlets in the intensity ratio 1:3. A undergoes methylation with CH_3I in liq. $NH_3/NaNH_2$ to produce '**C**' which gives a singlet at δ 2.1 in its ^{1}H NMR spectrum. 'C' undergoes hydration reaction with dil. H_2SO_4, containing Hg^{2+} ion to produce '**D**' (M.F. C_4H_8O) which shows in its ^{1}H NMR spectrum a singlet, a triplet and a quartet. Write the structures of A, B, C and D and rationalize your answer. (c) Which one between phenyl acetate and methyl benzoate shows higher $\nu_{C=O}$ stretching value in IR spectroscopy? (e) Calculate the λ_{max} value of the following compounds: **(2+4+2+2)**

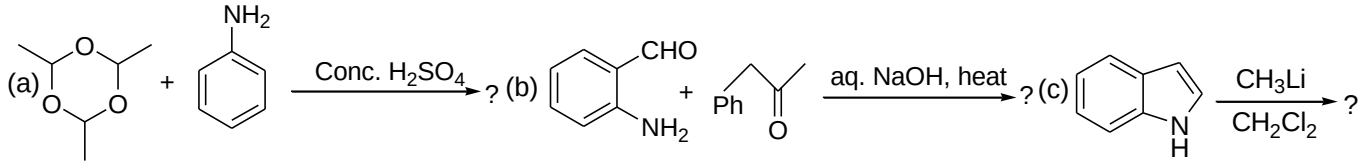
(i) 

(ii) 

4. (a) Discuss a process by which aldose can be stepped up by two carbon atoms? (b) How can you prove that glucose contain β-anomer in major amount in its aq. soln at equilibrium? (c) Salicine, $C_{13}H_{18}O_7$, found is hydrolysed to D-glucose and salignenin, $C_7H_8O_2$. Salicin doesn't reduce Tollens reagent. Oxidation of salicin by nitric acid yields a compound that can be hydrolysed to D-glucose and

salicaldehyde. Methylation of salicin gives pentamethylsalicin, which on hydrolysis gives 2,3,4,6 tetra *O*-methyl-D-glucose. What is the str. of salicin? (d) Convert D-arabinose to D-glucose. **(2+2+4+2)**

5. (a) Pyridine N-oxide is more effective than pyridine to carry out substitution reaction on its aromatic ring. Explain with example. (b) Predict the products with mechanism. **[2+(3+3+2)]**

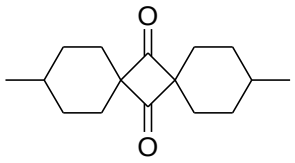


Group-B

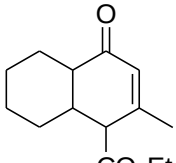
6. (a) Discuss various type of interaction involved in the 3° structure in protein.(b)If one protein chain of a DNA helix has the sequence ATGCTTGA, what is its complementary chain?(c) How lysine and glycine can be separated from each other? The P_I values are 9.6 for lysine and 5.97 for glycine. (d)What is the difference between glycosidic and glucosidic linkage. (e)What do you mean by denaturation of protein. (f) Draw the structure of N-heterocyclic base present in DNA. **(2+1+2+1.5+1.5+2)**

7. (a) Phenolpthalein is colorless in acid solution but exhibit a pink colour in alkaline solution and again colourless in strongly alkaline soln. Explain why? (b) Outline the synthesis of Alizarine and Indigotin. (c) Give preparation and use of PVC and sulphadiazine. **(2+4+4)**

8. (a) What are the different factors affecting keto enol tautomerism of β-diketone. (b) Ethyl isobutyrate can't undergo claisen condensation reaction with NaOEt but the reaction become successful using Ph_3CNa. (c) Design a retrosynthetic approach for the following compound '**E'.** (d) Synthesis **'F'** starting from EAA. **(2+2+3+3)**



(E)



(F)

9. (a) 1,3-diaxial form of cyclohexane 1,3-diol is more stable. Explain why? (b) Draw the topomer and enantiomer of trans 1,3-dimethyl cyclohexane. (c) Show major/minor product distribution in the reaction between (S)-2-phenyl propanal and CH_3MgI. (d) Convert cis-2,4-dimethyl cyclohexane to trans 1,3-dimethyl cyclohexane. (e) Draw the stable conformation of 2,4-di tertiary butyl cyclohexanone. **(1.5+2+2.5+2+2)**