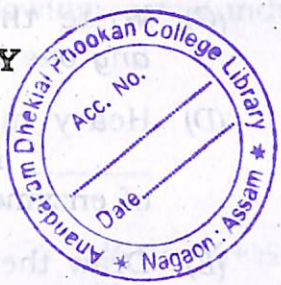
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1 (Sem–4/FYUGP) CHE 42 MJ

2026

CHEMISTRY

(Major)



Paper : CHE4400204MJ

(Organic Chemistry–I)

Full Marks : 45

Time : 2 hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : 1×5=5

(A) Which one is the strongest acid among *o*-, *m*-and *p*-hydroxybenzoic acid ?

(B) What happens when acetylene and H_2S is passed over Al_2O_3 at 400°*C*?

(C) Write the name and structure of *any one* basic amino acid.

(D) Heavy metal ions like _____ and _____ inhibit the activity of variety of enzymes. ½+½=1

(E) Draw the chemical structure and give IUPAC name of maleic acid. ½+½=1

2. Answer the following : ***(any five)*** 2×5=10

(a) By using Hoffmann degradation reaction, how can you prepare ethanamine ?

(b) Define auxochromes. What is red-shift in connection with UV-visible spectroscopy ? 1+1=2

(c) How will you prepare malic acid from maleic acid ?

(d) Define 'Zwitter ions'. Give *two* evidences in support of dipolar ionic structure of amino acids. 1+1=2

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(e) Carboxylic acids do not give characteristic reactions of carbonyl group. Explain.

(f) Explain briefly about the acidic character of pyrrole.

(g) What are the electronic transitions possible in the following compounds ?

(i) Methane

(ii) Etylbromide

(iii) Benzene

(iv) Formaldehyde ½+½+½+½=2

(h) What do you mean by enzyme inhibition ?

(i) What happens when acetylene and hydrocyanic acid is passed through red hot iron tube ? Write the chemical equation.

(j) What are the medicinal importances of Morphine ?

3. Answer ***any four*** from the following : 5×4=20

(a) What is Claisen Condensation reaction ? Write the reaction for preparation of ethyl acetoacetate (EAA). Provide a mechanism for the reaction. 1+1+3=5

(b) (i) How substituted pyrrole can be prepared by Hantzsch synthesis? 3

(ii) How will you prepare furan and thiophene derivatives from 1,4-dicarbonyl compound. 2

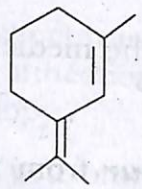
(c) (i) How primary aliphatic and aromatic amines can be distinguished by chemical reaction? 2

(ii) Explain Mannich reaction with mechanism. 3

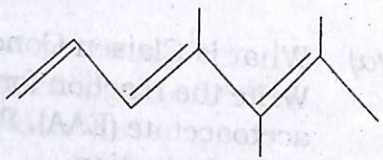
(d) (i) What is the range of UV-visible light? 1

(ii) Using Woodward-Fieser rule calculate the λ_{max} of the following compounds— 2+2=4

(A)



(B)



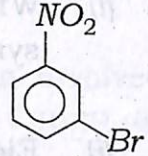
(e) How can you carry out the following transformation? 1×5=5

(i) $C_6H_5-N_2^+Cl^- \longrightarrow C_6H_5-Br$

(ii) $C_6H_5-N_2^+Cl^- \longrightarrow C_6H_5-C\equiv N$

(iii) $C_6H_5-N_2^+Cl^- \longrightarrow C_6H_5-OH$

(iv) $C_6H_6 \longrightarrow C_6H_5-NO_2$

(v) $C_6H_5-NO_2 \longrightarrow$ 

(f) What are peptides? Write about peptide bond formation and its structure and geometry. 1+1+3=5

(g) Write short notes on : 2½×2=5

(i) Reformatsky reaction

(ii) Madelung synthesis

(h) What is Emde's modification? Write about the medicinal importance of Reserpine. 3+2=5

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4. Answer ***any one*** from the following : 10

(a) (i) How will you prepare Malic acid and Tartaric acid from suceinic acid ? 2½×2=5

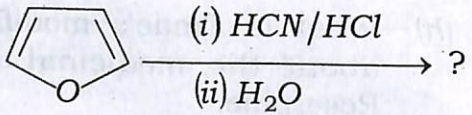
(ii) How will you distinguish between maleic acid and fumaric acid ? 2

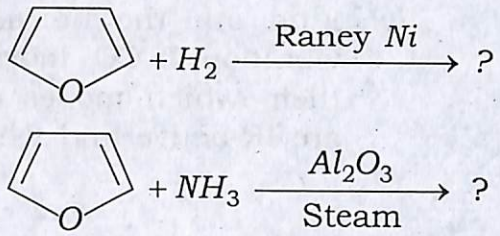
(iii) Which one is stronger acid between maleic acid and fumaric acid and why ? Define Chelation effect. 2+1=3

(b) (i) Write about Fischer Indole synthesis and give the mechanism. 4

(i) Electrophilic substitution of five membered heterocyclic compound like furan or thiophene usually takes place preferably at $C-2$ than $C-3$ position. Explain. 3

(iii) Complete the following reaction : 1×3=3





(c) (i) What are the different steps by which the primary structure of proteins can be determined ? 3

(ii) What do you mean by specificity of enzyme ? Elaborate with examples. 3

(iii) How amino acids can be synthesized from α-Halo acids ? 2

(iv) Give the reaction involved in the preparation of amino acids by Gabriel synthesis. 2

(d) (i) How can the two geometric isomers of stilbene be identified from λ_{max} values ? Values of UV-visible spectroscopy. 2

(ii) What do you mean by Fingerprint region in IR-spectroscopy ? Explain its significance. 3

(iii) What are the two different types of vibrational modes of polyatomic molecule ? 2

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(iv) Find out the normal modes of vibration in CO_2 molecule. Among them which modes of vibrations are IR-active and why? 3

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