Total No. of Printed Pages—9

4 SEM TDC CHM M 3

2013

(May)

CHEMISTRY

(Major)

Course : 403

(Organic Chemistry—II)

Full Marks : 48
Pass Marks : 19

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Choose the correct answer/Answer the following : 1×5=5

(a) The compound commonly used in the dye test of aromatic amine is

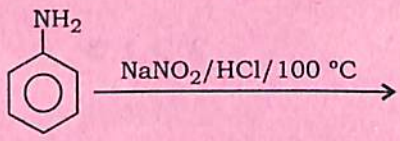
(i) naphthalene

(ii) β-naphthol

(iii) β-naphthylamine

(iv) anthraquinone

(b) The main product of the reaction



is

(i) benzenediazonium chloride

(ii) benzene

(iii) phenol

(iv) azobenzene

(c) What happens when alanine is treated with nitrous acid?

(d) What products will be formed when thiophen is treated with H_2 in presence of Raney nickel?

(e) Hemlock alkaloid which was responsible for the forced death of great philosopher Socrates contains

(i) strychnine

(ii) opium

(iii) coniine

(iv) nicotine

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

(a) How can primary, secondary and tertiary amines be distinguished with the help of nitrous acid?

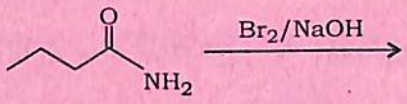
(b) Starting from diethyl malonate, how will you prepare an unsaturated acid?

(c) Explain why peptide C—N bond is stronger and shorter than the usual C—N single bond.

(d) How is Herzig-Meyer method helpful in structure determination of alkaloids?

(e) The dipole moment of pyridine (2·26D) is higher than that of piperidine (1·17D). Explain.

(f) Complete the following reaction and suggest the mechanism :



UNIT—I

Answer *any* **one** question

3. (a) What do you understand by active methylene group? Starting from ethyl acetoacetate, how will you prepare 3-methyl pentane-2-one? 1+1=2

(b) Starting from diethyl malonate, how would you synthesize the following? 1+1=2

(i) *n*-valeric acid

(ii) Succinic acid

4. *(a)* Starting from diethyl malonate, prepare cyclopropane carboxylic acid. 1

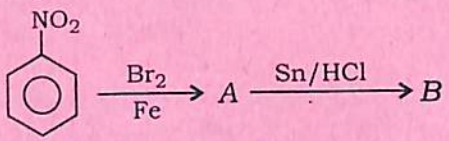
(b) How can you prepare 4-methyl uracil starting from ethyl acetoacetate? 1

(c) Acetoacetic ester is an equilibrium mixture of keto and enol forms. Give evidences in support of this statement. 2

UNIT—II

Answer *any* **one** question

5. *(a)* Identify *A* and *B* of the following : 1



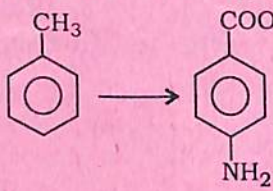
(b) Starting from benzenediazonium chloride, how would you prepare—

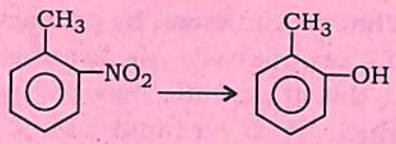
(i) *p*-amino azobenzene;

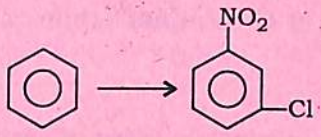
(ii) nitrobenzene? 1+1=2

(c) Convert the following (any *two*) : 1½×2=3

(i)



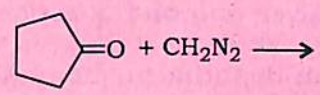
(ii) 

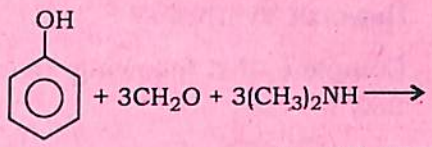
(iii) 

6. *(a)* $PhN_2^+Cl^-$ couples with Ph-NH_2 but not with 2,6-$Me_2C_6H_3NMe_2$. Explain. 1½

(b) How will you convert aniline to *m*-nitroaniline? 1½

(c) Complete the following reactions : 1×3=3

(i) 

(ii) 

(iii) $CHN_2COOC_2H_5 + [H] \xrightarrow{Zn/CH_3COOH}$

UNIT—III

Answer *any* **one** question

7. *(a)* Synthesize alanine by Gabriel's phthalimide synthesis. 2

(b) What do you mean by primary structure of a peptide? Gly-Ala-Ser is a tripeptide. In this tripeptide, how will you identify which is N-terminal amino acid and which is C-terminal amino acid? 1+2=3

8. (a) Define isoelectric point of amino acids. 1

(b) Explain briefly about the secondary structure of proteins. 2

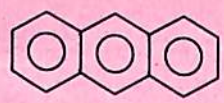
(c) Synthesize phenylalanine with the help of Strecker synthesis. 2

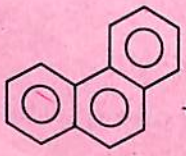
UNIT—IV

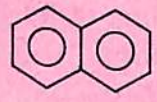
Answer *any* **one** question

9. (a) How can naphthalene be synthesized by Haworth synthesis? 2

(b) Complete the following reactions (any *two*) : 1×2=2

(i)  $+ CH_2O + HCl \longrightarrow$

(ii)  $+ CH_3COCl \xrightarrow{AlCl_3}$

(iii)  $\xrightarrow{Br_2/CCl_4}$

10. *(a)* The C_1—C_2 bond of naphthalene has greater double bond character than C_2—C_3 bond. Explain. 2

(b) How can phenanthrene be synthesized by Bardhan-Sengupta method? 2

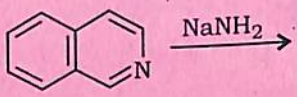
UNIT—V

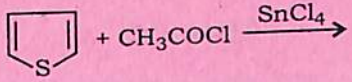
Answer *any* **one** question

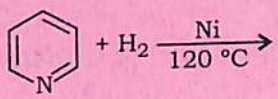
11. *(a)* Electrophilic substitution of pyrrole takes place at C-2 position. Explain. 2

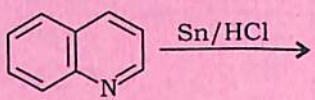
(b) Illustrate Fischer indole synthesis. 3

(c) Complete the following reactions (any *three*) : 1×3=3

(i) 

(ii) 

(iii) 

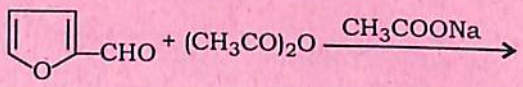
(iv) 

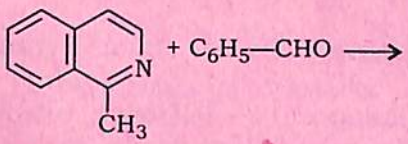
12. *(a)* Write Bichler-Napieralski synthesis of isoquinoline. 2½

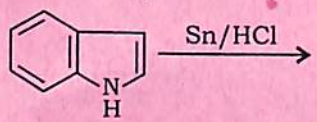
(b) Pyridine is a stronger base than pyrrole. Explain. 1

(c) How can quinoline be synthesized with the help of Skraup synthesis? 2½

(d) Complete the following reactions (any *two*) : 1×2=2

(i) 

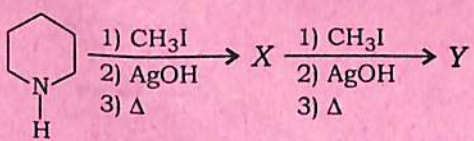
(ii) 

(iii) 

UNIT—VI

Answer *any* **one** question

13. *(a)* Complete the following transformation : 2



(b) Discuss the importance of Zeisel method in structure elucidation of alkaloids. 2

(c) Write one medicinal use each of quinine and cocaine. 2

14. (a) Write one medicinal use of morphine. 1

(b) Explain the importance of Hofmann's exhaustive methylation method in structure elucidation of alkaloids. What products will be obtained when this method is applied to coiine? 3+2=5

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