Total No. of Printed Pages—12

4 SEM TDC CHM M 3 (N/O)

2016

(May)

CHEMISTRY

(Major)

Course : 403

(Organic Chemistry)

The figures in the margin indicate full marks for the questions

(New Course)

Full Marks : 48

Pass Marks : 14

Time : 2 hours

1. Choose the correct answer from the following : 1×5=5

(a) Keto-enol tautomerism arises due to

(i) migration of a proton

(ii) migration of an enolic group

(iii) migration of a hydroxyl group

(iv) migration of a ketogroup

(b) Which of the following is most basic?

(i) Diphenylamine

(ii) *p*-toluidine

(iii) *p*-chloroaniline

(iv) *p*-nitroaniline

(c) Combination of α-amino acids through which linkages result in formation of protein is known as

(i) ester linkage

(ii) glycosidic linkage

(iii) peptide linkage

(iv) lactum linkage

(d) The alkaloid isolated from tea leaves is

(i) theobromine

(ii) uric acid

(iii) xanthine

(iv) caffeine

(e) The hybridization of N-atom in pyridine is

(i) sp

(ii) sp^2

(iii) sp^3

(iv) Not hybridized

(Continued)

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

(a) Synthesize succinic acid from ethyl acetoacetate (EAA).

(b) Explain Hofmann elimination reaction with the help of an example.

(c) What is zwitterion? Explain with the help of an example.

(d) Pyridine is more basic than pyrrole. Explain.

(e) Starting from β-naphthol, how will you synthesize β-naphthylamine?

(f) Define alkaloids. How are they isolated?

UNIT—I

3. (a) Starting from diethylmalonate, synthesize any *one* from the following : 2

(i) *n*-valeric acid

(ii) Succinic acid

(b) Starting from ethylacetoacetate, synthesize pentane-2,4-dione. 2

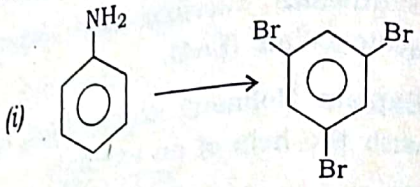
UNIT—II

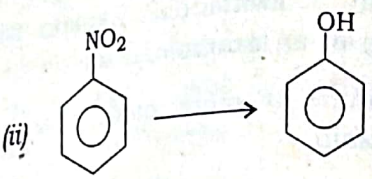
4. (a) What is Mannich base? Complete the following reaction : 1+1=2

$$HCHO + CH_3-NH_2 + CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-NO_2 \xrightarrow{H^+} A \xrightarrow{OH^-} B$$

(Turn Over)

(b) Convert any *one* of the following : 2

(i) 

(ii) 

5. (a) What happens when diazomethane reacts with (i) ethylene and (ii) acid chloride? 1+1=2

Or

How can alkyl isocyanates be prepared from primary amines? What happens when alkylisocyantes are refluxed with alcohols? 1+1=2

(b) What happens when propanamide is treated with bromine and aqueous KOH solution? 1

UNIT—III

6. (a) How can you synthesize glycin with the help of Gabriel's phthalimide synthesis? 2

(b) What is a polypeptide? Give one example of tripeptide. 2+1=3

(Continued)

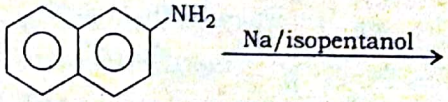
Or

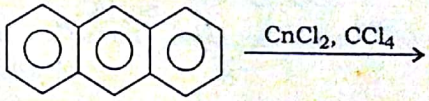
Explain briefly about the tertiary structure of proteins. 3

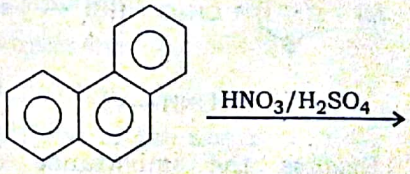
UNIT—IV

7. (a) Synthesize anthracene starting from tetralin showing all steps. 2

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

(i) 

(ii) 

(iii) 

UNIT—V

8. (a) Pyridine undergoes electrophilic substitution reactions preferentially at C-3 position. Explain. 2

(b) Synthesize 1-methyl isoquinoline with the help of Bischler-Napieralski synthesis. 3

(Turn Over)

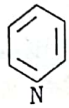
Or

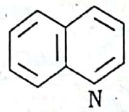
Synthesize 2,4-diethylpyrrole with the help of Paal-Knorr synthesis.

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

(i)  + $CHCl_3$ + KOH $\xrightarrow{alc.}$

(ii)  $\xrightarrow[CH_3COONa]{HgCl_2}$

(iii)  $\xrightarrow[H_2O/H^+]{NaNH_2/100\ °C}$

(iv)  $\xrightarrow{Sn/HCl}$

(v)  + CH_2O + HCl ⟶

UNIT—VI

9. (a) Discuss the importance of Zeisel's method in the structure determination of alkaloids. 2

(b) Explain Hofmann's exhaustive methylation considering the example of nicotine and give the name of the product. 2

(c) Write one medicinal use each of cocaine and reserpine. 1

(Old Course)

Full Marks : 48
Pass Marks : 19

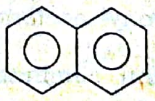
Time : 3 hours

1. Choose the correct answer from the following : 1×5=5

(a) Keto-enol taumerism is a
- (i) structural isomerism
- (ii) geometrical isomerism
- (iii) stereoisomerism
- (iv) None of the above

(b) The alkaloid isolated from tobacco leaves is
- (i) reserpine
- (ii) quinone
- (iii) nicotine
- (iv) None of the above

(c) The product of the following reaction is

 $\xrightarrow[V_2O_5]{O_2}$

- (i) phthalic acid
- (ii) phthalic anhydride
- (iii) anthranilic acid
- (iv) benzene

(d) The linkage through which α-amino acids undergo combination in the formation of protein is known as

(i) ester linkage

(ii) glycosidic linkage

(iii) peptide linkage

(iv) lactum linkage

(e) The hybridizing state of N-atom in pyrrole is

(i) sp

(ii) sp^2

(iii) sp^3

(iv) Not hybridized

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

(a) Pyrrole undergoes eletrophilic substitution at C-2. Explain.

(b) Starting from ethylacetoacetate, synthesize acetonyl acetone.

(c) Explain Hofmann elimination reaction with the help of an example.

(d) Discuss the importance of Zeisel's method in the structure determination of alkaloids.

(Continued)

(e) Define zwitterion with the help of an example.

(f) Naphthalene undergoes eletrophilic substitution reactions at the α-position, not at β-position. Explain.

UNIT—I

3. (a) Complete the following reaction and suggest the mechanism : 2

$$CH_3COOC_2H_5 \xrightarrow[2)\ HCl]{1)\ C_2H_5ONa}$$

Or

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

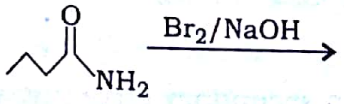
(b) Starting from diethylmalonate, synthesize any *one* from the following : 2

(i) An unsaturated acid

(ii) Barbituric acid

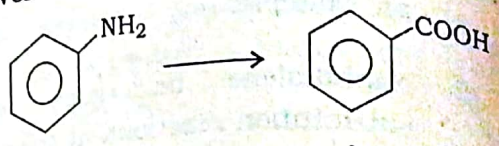
UNIT—II

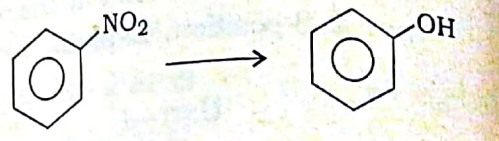
4. (a) Complete the following reaction and suggest the mechanism : 2



(Turn Over)

(b) Convert any *one* of the following : 2

(i) 

(ii) 

5. (a) Give one method of preparation of diazomethane. What happens when diazomethane reacts with an acid chloride? 2

Or

Give one method of preparation of alkyl isocyanide. Complete the following reaction : 2

$$RNC + HgO \longrightarrow$$

(b) What happens when ethylamine is treated with nitrous acid? Give reactions. 1

UNIT—III

6. (a) How can you synthesize phenyl alanine with the help of Strecker's synthesis? 2

(b) Define polypeptide. Write briefly about the peptide linkage. 1+2=3

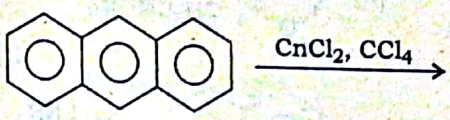
Or

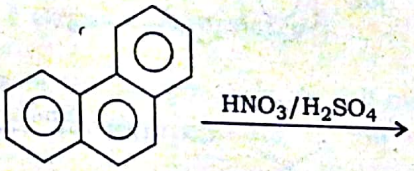
Explain secondary structure of proteins. 3

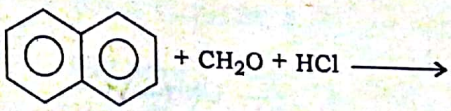
UNIT—IV

7. (a) Synthesize naphthalene with the help of Haworth synthesis showing all steps. 2

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

(i) 

(ii) 

(iii) 

UNIT—V

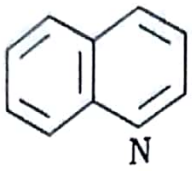
8. (a) Synthesize 1-ethyl isoquinoline with the help of Bischler-Napieralski synthesis. 3

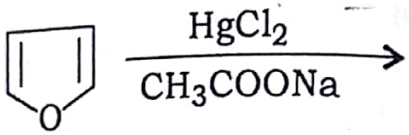
Or

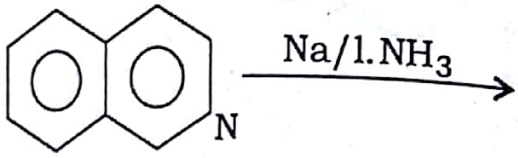
Synthesize thiophene with the help of Hantzsch synthesis. 3

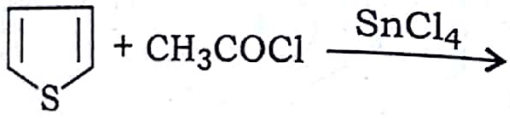
(b) Write in short about Knorr pyrrole synthesis. 2

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

(i) 

(ii) 

(iii) 

(iv) 

UNIT—VI

9. (a) Write one medicinal use each of morphine and reserpine.

(b) Define alkaloids. How are these isolated? 1+1=

(c) Discuss Hofmann's exhaustive methylation with the help of nicotine and give the name of the product.

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