

2017

( May )

CHEMISTRY

( Major )

Course : 403

( Organic Chemistry )

( New Course )

Full Marks : 48

Pass Marks : 14

Time : 2 hours

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

1. Choose the correct answer from the following :

1×5=5

- (a) The reaction used for the preparation of ethylacetoacetate starting from ethyl acetate is known as
- |                            |                               |
|----------------------------|-------------------------------|
| (i) Cannizzaro reaction    | (ii) Claisen condensation     |
| (iii) Michael condensation | (iv) Claisen-Schmidt reaction |
- (b) Diazomethane is used for the methylation of
- |              |                       |
|--------------|-----------------------|
| (i) alcohols | (ii) phenols          |
| (iii) amines | (iv) All of the above |
- (c) The alkaloid present in the bark of cinchona tree is
- |               |               |
|---------------|---------------|
| (i) cocaine   | (ii) hygrine  |
| (iii) orinine | (iv) morphine |
- (d) The electrophilic substitution in quinoline occurs at
- |                         |                        |
|-------------------------|------------------------|
| (i) 2-position          | (ii) 3-position        |
| (iii) 3- and 5-position | (iv) 5- and 8-position |

(e) Arrangement of peptide chains of protein in space to form helix structure is referred to as

- (i) primary structure
- (ii) secondary structure
- (iii) tertiary structure
- (iv) quaternary structure

2. Answer any five from the following :

2×5=10

- (a) Aniline is less basic than aliphatic primary amines. Explain.
- (b) Synthesize 3-methyl-pentan-2-one from ethylacetoacetate.
- (c) Explain, why peptide C—N bond is stronger and shorter than the usual C—N bond.
- (d) The 9- and 10-positions of anthracene are very reactive towards electrophilic substitution. Explain.
- (e) The dipole moments of pyrrole and pyridine are in opposite direction. Explain.
- (f) Define Zeisel's method in structure elucidation of alkaloids.

#### UNIT—I

3. (a) Starting from ethylacetoacetate, synthesize any one from the following :

2

- (i)  $\alpha$ -methyl-*n*-valeric acid
- (ii) Crotonic acid (using Knoevenagel reaction)

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

2

- (i) Cyclobutane carboxylic acid
- (ii) Adipic acid

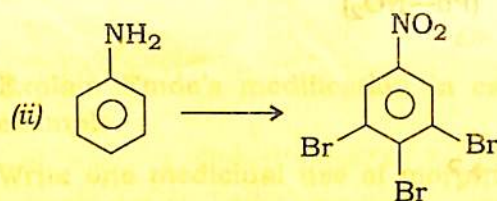
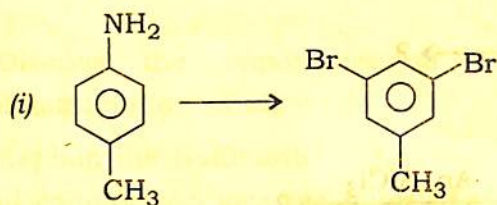
#### UNIT—II

4. (a) How can primary, secondary and tertiary amines be separated with the help of Hinsberg reagent? Explain.

2

(b) Convert any one of the following :

2



5. (a) How will you convert propylamine into ethylamine?

1

(b) What happens when diazomethane reacts with—

(i) propanol;

(ii) ethyne?

1+1=2

Or

How will you prepare the following?

1+1=2

(i) Ethyldiazoacetate

(ii) Alkyl cyanide

### UNIT—III

6. (a) Synthesize alanine with the help of Strecker synthesis.

2

(b) Define peptide linkage. Explain briefly about the secondary structure of proteins.

1+2=3

Or

What is isoelectric point of amino acid? Explain briefly about the electrophoresis of amino acids.

1+2=3

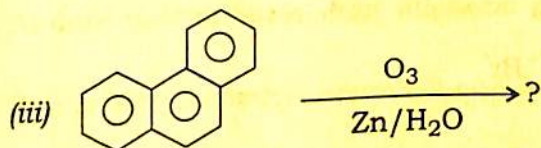
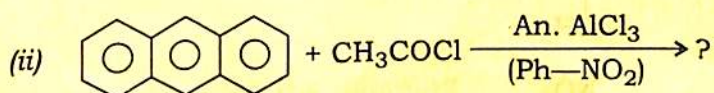
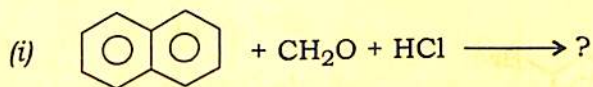
### UNIT—IV

7. (a) Synthesize 1-methylnaphthalene starting from benzene.

2

(b) Complete the following reactions (any two) :

1×2=2



UNIT—V

8. (a) Pyrrole undergoes electrophilic substitution at C-2 position preferentially. Explain. 2

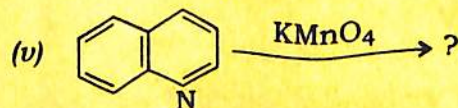
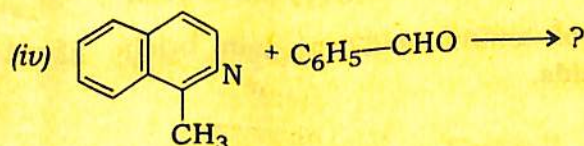
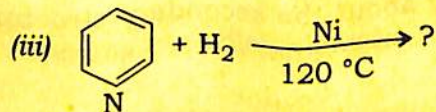
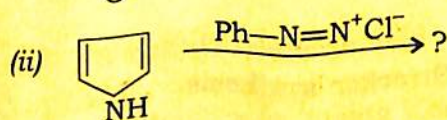
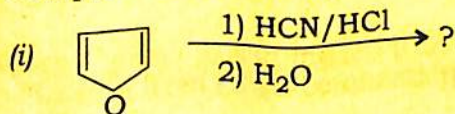
(b) Synthesize quinoline with the help of Skraup synthesis. 3

Or

Synthesize 2,5-dimethylfuran with the help of Paal-Knorr synthesis. 3

(c) Complete the following reactions (any three) :

1×3=3



UNIT—VI

9. (a) Discuss the importance of Herzig-Meyer method in structure determination of alkaloids. 1
- (b) Explain the Hoffmann's exhaustive methylation considering the example of coniine and give the name of the product. 2+1=3

Or

Explain Emde's modification in case of alkaloids with the help of an example. 3

- (c) Write one medicinal use of morphine. 1

( Old Course )

Full Marks : 48

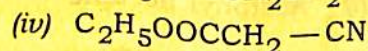
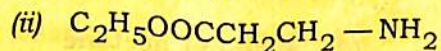
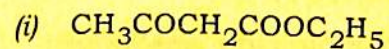
Pass Marks : 19

Time : 3 hours

The figures in the margin indicate full marks for the questions

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

- (a) Which of the following is not an active methylene compound?



- (b) A mixture of primary, secondary and tertiary amines is easily separated using

(i) dialkyl oxamide

(ii) oxamic ester

(iii) benzene sulphonyl chloride

(iv) alkyl sulphonamide

- (c) The alkaloid obtained from *Rauwolfia serpentina* is

(i) reserpine

(ii) atropine

(iii) strychnine

(iv) nicotine

- (d) Which of the following is most basic in nature?

(i) Pyrrole

(ii) Aniline

(iii) Pyridine

(iv) Thiophene

- (e) Amino acids have

(i) acidic groups

(ii) basic groups

(iii) Both of the above

(iv) None of the above

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

- (a) Synthesize cinnamic acid from diethylmalonate using Knoevenagel reaction.
- (b) The dipole moment of pyridine is higher than that of piperidine. Explain.
- (c) Discuss the importance of Herzog-Meyer method in the structure determination of alkaloids.
- (d) Write in short about electrophoresis of amino acids.
- (e) Give one method of preparation of benzenediazonium chloride. What happens when benzenediazonium chloride is boiled with water?
- (f) Arrange benzene, naphthalene and anthracene in increasing order of reactivity, giving reasons.

UNIT—I

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

(i) *n*-valeric acid

(ii) Barbituric acid

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

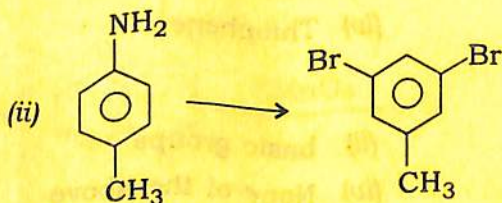
(i) Acetyl acetone

(ii) Succinic acid

UNIT—II

4. (a) How can primary, secondary and tertiary amines be distinguished with the help of nitrous acid? 2

(b) Convert any one of the following : 2



5. (a) Convert methylamine into ethylamine. 1

(b) Give one method of preparation of diazomethane. What happens when diazomethane reacts with phenol? Give reactions. 2

Or

Give one method of preparation of each of alkyl cyanide and alkyl isocyanide. 2

### UNIT—III

6. (a) How would you synthesize phenylalanine with the help of Strecker's synthesis? 2

(b) What is peptide linkage? Explain in short about the tertiary structure of proteins. 1+2=3

Or

Define protein. Discuss the classification of proteins on the basis of composition with an example of each class. 1+2=3

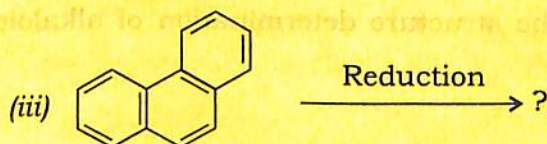
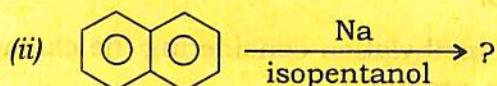
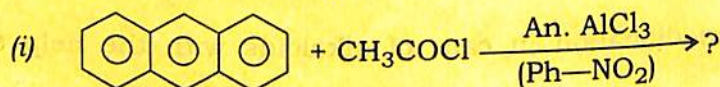
### UNIT—IV

7. (a) Anthracene undergoes electrophilic substitution reactions at C-9 and C-10 positions. Explain. 2

Or

Starting from benzene, synthesize anthracene. 2

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



UNIT—V

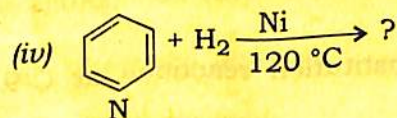
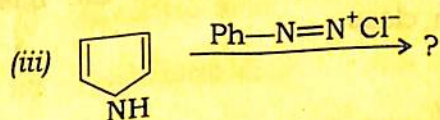
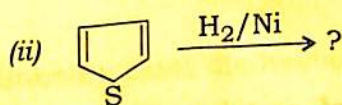
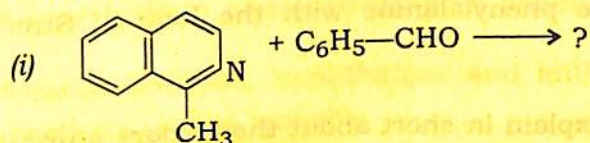
8. (a) Synthesize quinoline with the help of Skraup synthesis. 3

(b) Furan undergoes electrophilic substitution preferentially at C-2 position. Explain. 2

Or

Synthesize thiophene with the help of Hantzsch synthesis. 2

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



UNIT—VI

9. (a) Write one medicinal use for each of nicotine and quinine. 1

(b) Explain Emde's modification in case of alkaloids with the help of an example. 3

Or

Explain the Hoffmann exhaustive methylation considering the example of coniine and give the name of the product. 3

(c) Explain Zeisel's method for the structure determination of alkaloids. 1

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