63/1 (SEM–4) CC9/CHMHC4096

2025

CHEMISTRY

Paper : CHMHC4096

(Organic Chemistry–III)

Full Marks : 60

Pass Marks : 24

Time : Three hours

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

1. Choose the correct answer : ***(any five)*** 1×5=5

   (a) When a primary amine reacts with $CHCl_3$ and alcoholic *KOH*, then the product formed is

   (i) aldehyde

   (ii) cyanide

   (iii) isocyanide

   (iv) alcohol

(b) Excessive nitration of nitrobenzene yields

(i) 1,3,5-trinitrobenzene

(ii) *o*-dinitrobenzene

(iii) *p*-dinitrobenzene

(iv) *m*-dinitrobenzene

(c) All carbon atoms in naphthalene are

(i) *SP*-hybridized

(ii) SP^2-hybridized

(iii) SP^3-hybridized

(iv) dsp^2-hybridized

(d) Which of the following is a six-membered ring ?

(i) Pyrrole

(ii) Furan

(iii) Thiophene

(iv) Pyridine

(e) Quinine is obtained from the bark of which tree ?

(i) Redwood

(ii) Banyan

(iii) Eucalyptus

(iv) Cinchona

(f) Which of the following is not an aromatic compound ?

(i) Furan

(ii) Pyrrole

(iii) Pyridine

(iv) Piperidine

(g) Skraup synthesis is used to prepare

(i) Pyridine

(ii) Isoquinoline

(iii) Quinoline

(iv) Indole

(h) Aniline reacts with bromine water to give :

(i) *m*-bromoaniline

(ii) *o*-bromoaniline

(iii) 2,4,6-tribromoaniline

(iv) 2,4-dibromoaniline

(i) Naphthalene on oxidation with CrO_3-acetic acid gives

(i) phthalic anhydride

(ii) 1,4-naphthaqouinone

(iii) Phthalonic acid

(iv) Phthalic acid

(j) How many isoprene units are there in monoterpenes ?

(i) 1

(ii) 2

(iii) 3

(iv) 4

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

(a) What happens when a primary amine is heated with $CHCl_3$ and alcoholic KOH? Write the mechanism of the reaction.

(b) Convert naphthalene into naphthol.

(c) Write the IUPAC names of the following :

(d) Write the chemical reaction for the conversion of aniline into chlorobenzene.

(e) How are terpenes classified ?

(f) Write *one* method of preparation of Pyrrole.

(g) Write *one* chemical reaction to distinguish CH_3CN and CH_3NC.

3. Answer the following questions : ***(any five)*** 5×5=25

(a) What is aromatic diazonium salt ? How is benzene diazonium chloride prepared in the laboratory ? How do you get benzene from benzene diazonium chloride ? 1+2+2=5

(b) Write the medicinal importance of the following : 1×5=5

Cocaine, Morphine, Nicotine, Quine and Reserpine

(c) Explain isoprene rule. Write some properties of terpenoids. 3+2=5

(d) How will you convert the following : ***(any two)*** 2½×2=5

(i) Aniline to *p*-bromoaniline

(ii) Aniline to *m*-nitroaniline

(iii) Aniline to phenol

(e) (i) What happens when α-naphthol is oxidized by alkaline $KMnO_4$?

(ii) How will you convert α-naphthol into 1,4 naphthaquinone ?

(iii) What is chloromethylation ? 2+2+1=5

(f) Explain the electrophilic aromatic substitution reaction of Pyrrole.

(g) Write the reduction reaction of nitrobenzene under the following condition : 1×5=5

(i) Catalytic reduction

(ii) Reduction in acidic medium

(iii) Reduction in alkaline medium

(iv) In neutral medium

(v) Electrolytic reduction

(h) Write a short note on "Fischer indole synthesis".

(i) Explain the electrophilic aromatic substitution reaction of Pyridine.

4. Answer the following questions : ***(any two)*** 10×2=20

(a) (i) What are alkaloids ? Give *two* examples. What are their main functions ? Mention *two* physiological actions of alkaloids. 1+1+2+2+=6

(ii) How will you establish the position of two carbon-carbon double bonds in citral molecule ? Mention *one* use of citral. 3+1=4

(b) (i) How will you distinguish primary, secondary and tertiary amines by Hinsberg's test ? 5

(ii) Write a short note on Sandmeyer reaction. 5

(c) Explain the following : 2×5=10

(i) Toluene is more easily nitrated than benzene.

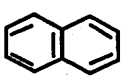
(ii) Thiophene is more aromatic than Pyrrole.

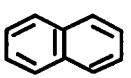
(iii) Furan is a weak base.

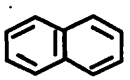
(iv) Naphthalene at high temperature gives mainly β-naphthalene sulphonic acid.

(v) Addition reaction of anthracene mainly takes place at 9 and 10 position.

(d) Complete the following reactions : 1×10=10

(i)  $\xrightarrow{Na/C_2H_5OH}$?

(ii)  $\xrightarrow{Ni/H_2}$?

(iii)  $\xrightarrow[500°C]{V_2O_5/O_2}$?

(iv)  $+ H-CHO + HCl \longrightarrow$?

(v)  $+ NaNH_2 \xrightarrow{\Delta}$?

(vi)  $\xrightarrow{CHCl_3+KOH}$?

(vii) $HC \equiv CH + H_2S \xrightarrow[\Delta]{Al_2O_3}$?

(viii)  $\xrightarrow[\Delta]{NH_3/Al_2O_3}$?

(ix) $C_2H_5Br + AgCN \longrightarrow$?

(x) $C_2H_5 - CN + H_2O \xrightarrow[Cold]{H+}$