Answers to Some Questions in Exercises

UNIT 7

7.1 (i) 2,2,4-Trimethylpentan –3-ol

(iii) Butane -2,3-diol

(v) 2- Methylphenol

(vii) 2,5 - Dimethylphenol

(ix) 1-Methoxy-2-methylpropane

(xi) 1-phenoxyheptane

7.2

(iii)
$$HOCH_2 - CH_2 - C - CH_2 - C - CH_3 - CH_3$$

(v) $C_2H_5 - O - CH_2 - CH_2 - CH_3$

(vii)

7.3 (i) (a) CH₂CH₂CH₂CH₂CH₂OH, Pentan-1-ol;

(b) $CH_3-CH_2-CH-CH_2-OH$, 2-Methylbutan-1-ol; CH₃

(c) CH₃-C-CH₂OH, 2,2-Dimethylpropan-1-ol CH₃

(e) CH₃-CH₂-OH-CH₂-CH₃, Pentan-3-ol

CH₃ (g) CH₃-CH₂-C-OH, 2-Methylbutan-2-ol

Hydrogen bonding in propanol.

(ii) 5-Ethylheptane -2, 4-diol

(iv) Propane -1,2,3,-triol

(vi) 4-Methylphenol

(viii) 2,6-Dimethylphenol

(x) Ethoxybenzene

(xii) 2 -Ethoxybutane

ÓН

OH

(vi) CH₃-CH — CH – CH₂ – CH₃ OC2H5 CH3

(viii) CH₃-CH₂-C-CH₂-CH₃

OH (d) CH₃-CH₂-CH-CH₂-CH₃, Pentan-3-ol

(f) CH₃-CH-CH-CH₃, 3-Methylbutan-2-ol CH₃ OH

3-Methylbutan-1-ol

- **7.5** Hydrogen bonding between alcohol and water molecules.
- 7.8 o-Nitrophenol is steam volatile because of intramolecular hydrogen bonding.
- 7.12 Hint: Carryout sulphonation followed by nucleophilic substitution.

7.13 (i)
$$H^+/H_2O$$
 $CH(OH)CH_3$

(ii)
$$CH_2CI$$
 CH_2OH + NaOH CH_2OH

- (iii) $CH_3(CH_2)_4CI + NaOH \longrightarrow CH_3(CH_2)_4OH + NaCI$
- 7.14 Reaction with (i) sodium and (ii) sodium hydroxide
- 7.15 Due to electron withdrawing effect of nitro group and electron releasing effect of methoxy group.
- **7.20** (i) Hydration of Propene.
 - (ii) By nucleophilic substitution of -Cl in benzyl chloride using dilute NaOH.
 - (iii) $C_2H_5MgBr + HCHO \rightarrow C_2H_5CH_2OMgBr \xrightarrow{H_2O} C_2H_5CH_2OH$

(iv)
$$CH_3MgBr + CH_3COCH_3 \longrightarrow CH_3 - COMgBr \xrightarrow{H_2O} CH_3 - CH_3$$

 $CH_3 \longrightarrow CH_3 - COMgBr \xrightarrow{H_2O} CH_3 - COMgBr \xrightarrow{CH_3}$

- **7.23** (i) 1-Ethoxy-2-methylpropane.
 - (ii) 2-Chloro-1-methoxyethane.
 - (iii) 4-Nitroanisole.
 - (iv) 1-Methoxypropane.
 - (v) 1-Ethoxy-4,4-dimethylcyclohexane.
 - (vi) Ethoxybenzene.

UNIT 8

- 8.2 (i) 4-Methylpentanal
 - (iii) But-2-enal
 - (v) 3,3,5-Trimethylhexan-2-one
 - (vii) Benzene -1,4-dicarbaldehyde
- $\begin{array}{ccc} & CH_3 & O \\ & & \parallel \\ \textbf{8.3} & \text{(i)} & H_3C-CH-CH_2-C-H \end{array}$

(iii)
$$H_3C$$
 $C-H$

- (ii) 6-Chloro-4-ethylhexan-3-one
- (iv) Pentane-2,4-dione
- (vi) 3,3-Dimethylbutanoic acid

(iv)
$$H_3C-C-CH=C-CH$$

Br O | | | (vi)
$$H_3C$$
- CH - CH - CH_2 - C - OH - C_3H_4

Chemistry 304

(viii) H₃C-C≡C-CH=CH-C-OH

- **8.4** (i) Heptan-2-one
- (ii) 4-Bromo-2-methylhexanal
- (iii) Heptanal

- (iv) 3-Phenylprop-2-enal
- (v) Cyclopentanecarbaldehyde
- (vi) Diphenylmethanone

$$\textbf{8.5} \qquad \text{(i)} \qquad \begin{array}{c} & \text{NO}_2 \\ & \text{CH=N.NH} \end{array} \longrightarrow \text{NO}_2$$

(iii)
$$CH_3$$
- CH $< OCH_3 OCH_3$

(iv)
$$\stackrel{\text{O}}{\parallel}$$
 NNH-C-NH₂

(vi)
$$H-C \stackrel{OH}{\underset{H}{\overleftarrow{OCH_3}}}$$

8.6

(ii)
$$\bigcap_{C} \overline{O}$$

(iii)
$$CH=NNH-C-NH$$

(iv)
$$OC_2H_5$$

 C
 H
 OC_2H_5

(v)
$$CH_3$$

- 8.7 (ii), (v), (vi), (vii): Aldol condensation. (i), (iii), (ix) Cannizaro reaction. (iv), (viii) Neither.
- 8.10 2-Ethylbenzaldehyde (draw the structure yourself).
- 8.11 (A) CH₂CH₂CH₂COOCH₂CH₂CH₂CH₃, butyl butanoate.
 - (B) CH₃CH₂CH₂COOH (C) CH₃CH₂CH₂CH₂OH. Write equation yourself.
- 8.12 (i) Di-tert-butyl ketone < Methyl tert-butyl ketone < Acetaldehyde
 - (ii) (CH₂)₂CHCOOH < CH₂CH₂COOH < CH₂CH(Br)COOH < CH₂CH₂CH(Br)COOH
 - (iii) 4-Methoxybenzoic acid < Benzoic acid < 4-Nitrobenzoic acid < 3,4-Dinitrobenzoic acid.

(iii) C₆H₅CH=NNHC-NH₂

OH

$$(v)$$
 O $CO\bar{O}$

(vii)
$$C_6H_5CH=C-CHO + other$$
 products

(viii)
$$CH_3CH(OH)CH_2COOC_2H_5$$

(x) 1.
$$BH_3$$
; 2. $H_2O_2/\overline{O}H$; 3. PCC

8.19 The compound is methyl ketone and its structure would be: CH₃COCH₂CH₂CH₃

UNIT 9

9.1 (i) 1-methylethylamine or propan-2-amine

- (ii) Propan-1-amine
- (iii) N-methyl-2-methylethylamine or N-methylpropan-2-amine (iv) 2-methylpropan-2-amine
 - (vi) N-Ethyl-N-methylethanamine
- (v) N-methylbenzenamine or N-methylaniline

9.4 (i) $C_6H_5NH_2 < C_6H_5NHCH_3 < C_2H_5NH_2 < (C_2H_5)_2NH$

- (vii) 3-Bromoaniline or 3-Bromobenzenamine
- (ii) $C_6H_5NH_2 < C_6H_5N(CH_3)_2 < CH_3NH_2 < (C_2H_5)_2NH$
- (iii) (a) p-nitroaniline < aniline < p-toluidine
 - (b) $C_6H_5NH_2 < C_6H_5NHCH_3 < C_6H_5CH_2NH_2$
- (iv) $(C_2H_5)_3N > (C_2H_5)_2NH > C_2H_5NH_2 > NH_3$ (v) $(CH_3)_2NH < C_2H_5NH_2 < C_2H_5OH$
- (vi) $C_6H_5NH_2 < (C_2H_5)_2NH < C_2H_5NH_2$



