

Solution of DPP #9

TARGET: JEE (ADVANCED) 2015 Course: VIJETA & VIJAY (ADP & ADR)

CHEMISTRY

1.
$$O_{2}N \longrightarrow O_{2}N \longrightarrow O_{2}N$$

$$\textbf{2.} \qquad \text{CH}_{3} - \text{CH}_{2} \text{CI} \xrightarrow{\text{(i) KCN}} \text{CH}_{3} \text{CH}_{2} \text{CH}_{2} \text{NH}_{2} \qquad ; \qquad \text{CH}_{3} - \text{CH}_{2} \text{CI} \xrightarrow{\text{(i) AgCN}} \text{CH}_{3} \text{CH}_{2} - \text{NH} - \text{CH}_{3}$$

3.
$$O_2N$$
 $C=C$ CH_3 $HOBr/H^{\bigoplus}$ O_2N $C=C$ CH_3 H_2O CH_3 CH_3

4.
$$CH = CH_2 \xrightarrow{HBr/R_2O_2} CH_2 \xrightarrow{CH_2} CH_2 \xrightarrow{KCN} Ph-CH_2-CH_2-C \stackrel{\delta-}{=} N \xrightarrow{\delta-} MgX$$

$$\begin{array}{c} CH_3 \\ I \\ Ph-CH_2-CH_2-C=N-MgX \end{array} \xrightarrow{H_2O} Ph-CH_2-CH_2-C-CH_3$$

6. Chlorination is less reactive so 2° chloroproduct is major as per calculation Bromination is more selective so 3° bromo product is major.

7.
$$\begin{array}{c} H \\ Ph \end{array} C = C \\ \begin{array}{c} H \\ Ph \end{array} \begin{array}{c} MCPBA \\ Meta \ chlorperbenzoic \ acid \end{array} \begin{array}{c} H \\ Ph \end{array} \begin{array}{c} C \\ Ph \end{array}$$
(Meso)

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- 11. Sucrose has 8 –OH groups so forms octaacetate.
- (B) Phe—Val—Asp—Glu—His $\xrightarrow{H_3O^{\oplus}}$ Phe—Val + Val—Asp + Asp—Glu + Glu—His 12.
- 13. The compound is sucrose which on hydrolysis gives equimolar mixture of glucose and fructose.

14.
$$(X) = Tagatose =$$

$$HOH_{2}C OH CH_{2}OH C = O$$

$$H OH OH H OH CH_{2}OH C = O$$

$$H OH OH H OH CH_{2}OH C = O$$

$$H OH OH CH_{2}O$$

$$\begin{array}{c|cccc} & & & & & & & & \\ & & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & & \\ & \\ & & \\$$

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Tollen's reagent

17.
$$H - C \equiv C - CH - CH = CH_2 \xrightarrow{H^{\oplus}} H - C \equiv C - CH - CH = CH_2 \xrightarrow{-H_2O}$$

$$OH \qquad \qquad \ThetaOH_2$$

$$H_{2}O(-H^{\bigoplus}) \qquad H-C \equiv C-CH = CH-CH_{2} \iff H-C \equiv C-CH-CH = CH_{2}$$

$$H-C\equiv C-CH=CH-CH_2 \label{eq:chi}$$
 (D) OH

$$H - \overset{\oplus}{C} = C = CH - CH = CH_2$$

$$\int_{\mathbb{R}} H_2O(-H^+)$$

$$H-C-CH=CH-CH=CH_2$$
 tautomerises $H-C=C=CH-CH=CH_2$ $O-H$

18. chain propagation steps are

$$R\mathring{O} + CH_4 \longrightarrow ROH + \mathring{C}H_3$$
 ; $\mathring{C}H_3 + CI_2 \longrightarrow CH_3CI + \mathring{C}I$

20.
$$\begin{array}{c|c} CH_3 & H \\ \hline & B_2H_6 \\ \hline & \delta_- \delta_+ \\ H_- B & H_2 \end{array} \end{array} \begin{array}{c} CH_3 \\ \hline & B \\ \hline & B_2O_2/OH^\Theta \end{array} \begin{array}{c} H_3C^{1111} \\ \hline & H_3C^{1111} \end{array}$$

Stereospecific **syn** addition ; BH₃ act as electrophile

21.
$$CH_3-CH-CH_2-CH_3 \xrightarrow{Alc. KOH} CH_2=CH-CH_2-CH_3+CH_3-CH=CH-CH_3$$

(E + Z)

$$CH_2 = CH - CH_2 - CH_3 \xrightarrow{Br_2/CCl_4} CH_3 - CH_2 - CH_2 - Br \\ Br \\ (d+\ell)$$

$$\begin{array}{c} CH_3 \\ C=C \\ H \end{array} \xrightarrow{Br_2/CCl_4} \begin{array}{c} H \\ Br \\ CH_3 \\ Br \end{array} \hspace{0.5cm} ; \hspace{0.5cm} \begin{array}{c} CH_3 \\ C=C \\ CH_3 \end{array} \xrightarrow{Br_2/CCl_4} \begin{array}{c} H \\ H \\ CH_3 \end{array} \xrightarrow{Br} \begin{array}{c} CH_3 \\ Br \\ CH_3 \end{array}$$

It has a hemiacetal structure

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33.
$$CH_{3}-CH-CH=CH_{2} \xrightarrow{\text{aq. AgNO}_{3}} CH_{3}-CH-CH=CH_{2} \longleftrightarrow CH_{3}-CH=CH-CH_{2} \longleftrightarrow CH_{3}-CH-CH_{2} \longleftrightarrow CH_{3}-CH-CH_{2} \longleftrightarrow CH_{3}-CH-CH_{2} \longleftrightarrow CH_{3}-CH-CH_{2} \longleftrightarrow CH_{3}-CH-CH_{2} \longleftrightarrow CH_{3}-CH-CH_{2} \longleftrightarrow CH_{3}-CH-CH_{2}$$

Structural = 2 diastereomers = 2

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34.
$$(2)$$
 (2) (1) (1)

36.
$$\begin{bmatrix} CH_3 - CH_2 - CH - \\ CH_2 - CH_3 \end{bmatrix}_2 CuLi + CH_3 - CH_2 - Br \longrightarrow \begin{bmatrix} CH_3 - CH_2 - CH - CH_2 - CH_3 \\ CH_2 - CH_3 \end{bmatrix} \xrightarrow{Cl_2/h\nu} (X)$$

4 isomers (with one $d\ell$ pair) Fractional distillation \rightarrow 3 fractions

so in total 4 stereoisomers are reduced to meso products.

39.
$$\begin{array}{c} CH_3-C-O-CH_2-CH_2 \\ \hline \\ O \\ \hline \\ CH_3 \end{array} \begin{array}{c} CH_2=CH-CH_3 \\ \hline \\ OH \end{array} \begin{array}{c} CH-CH_3 \\ \hline \\ OH \end{array} \begin{array}{c} CH-CH_3 \\ \hline \\ OH \end{array} \begin{array}{c} CH-CH_3 \\ \hline \\ OH \end{array}$$

40.
$$CH_3-CH=CH_2 \longrightarrow CH_3 - CH = O + CH_2 = O \xrightarrow{1. \text{ NaOH} \atop (A)} (D) C(CH_2OH)_4 + HCOOH$$

Answer: 136/4 = 34

41.
$$\xrightarrow{\text{Na}}$$
 $\xrightarrow{\text{ether}}$ $\xrightarrow{\text{ether}}$ $\xrightarrow{\text{Na}}$ $\xrightarrow{\text{ether}}$ $\xrightarrow{\text{Na}}$ $\xrightarrow{\text{ether}}$ $\xrightarrow{\text{Na}}$ $\xrightarrow{\text{ether}}$ $\xrightarrow{\text{Na}}$ $\xrightarrow{\text{Na}}$ $\xrightarrow{\text{Na}}$ $\xrightarrow{\text{ether}}$ $\xrightarrow{\text{Na}}$ $\xrightarrow{\text{Na}}$

Mol. wt. of $C_6H_{10}O_3 = 72 + 10 + 48 = 130/10 = 13$

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