

Answer to Some Selected Problems

UNIT 8

8.25 15 g

UNIT 12

12.32 Mass of carbon dioxide formed = 0.505 g

Mass of water formed = 0.0864 g

12.33 % of nitrogen = 56

12.34 % of chlorine = 37.57

12.35 % of sulphur = 19.66

UNIT 13

13.1 Due to the side reaction in termination step by the combination of two $\dot{\text{C}}\text{H}_3$ free radicals.

- 13.2 (a) 2-Methyl-but-2-ene (b) Pent-1-ene-3-yne
 (c) Buta-1, 3-diene (d) 4-Phenylbut-1-ene
 (e) 2-Methylphenol (f) 5-(2-Methylpropyl)-decane
 (g) 4-Ethyldeca -1,5,8- triene

- 13.3 (a) (i) $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{CH}_3$ But-1-ene
 (ii) $\text{CH}_3 - \text{CH}_2 = \text{CH} - \text{CH}_3$ But-2-ene
 (iii) $\text{CH}_2 = \underset{\text{CH}_3}{\text{C}} - \text{CH}_3$ 2-Methylpropene

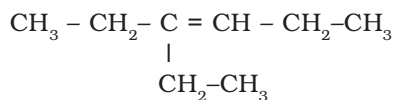
- (b) (i) $\text{HC} \equiv \text{C} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ Pent-1-yne
 (ii) $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_2 - \text{CH}_3$ Pent-2-yne
 (iii) $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{C} \equiv \text{CH}$ 3-Methylbut-1-yne

- 13.4 (i) Ethanal and propanal (ii) Butan-2-one and pentan-2-one
 (iii) Methanal and pentan-3-one (iv) Propanal and benzaldehyde

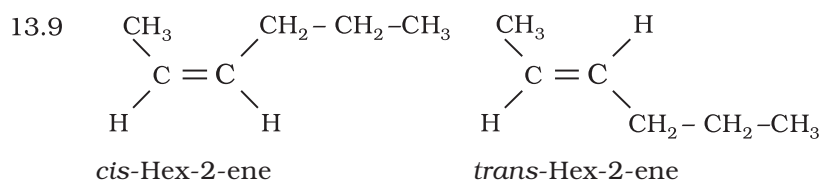
13.5 3-Ethylpent-2-ene

13.6 But-2-ene

13.7 4-Ethylhex-3-ene



- 13.8 (a) $C_4H_{10}(g) + 13/2 O_2(g) \xrightarrow{\Delta} 4CO_2(g) + 5H_2O(g)$
 (b) $C_5H_{10}(g) + 15/2 O_2(g) \xrightarrow{\Delta} 5CO_2(g) + 5H_2O(g)$
 (c) $C_6H_{10}(g) + 17/2 O_2(g) \xrightarrow{\Delta} 6CO_2(g) + 5H_2O(g)$
 (d) $C_7H_8(g) + 9O_2(g) \xrightarrow{\Delta} 7CO_2(g) + 4H_2O(g)$



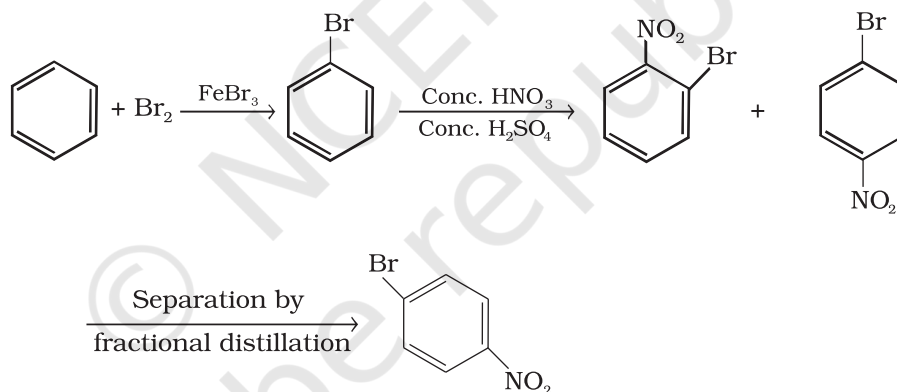
The *cis* form will have higher boiling point due to more polar nature leading to stronger intermolecular dipole-dipole interaction, thus requiring more heat energy to separate them.

13.10 Due to resonance

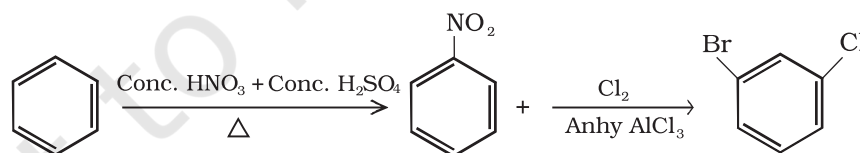
13.11 Planar, conjugated ring system with delocalisation of $(4n+2)$ π electrons, where, n is an integer

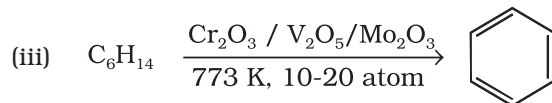
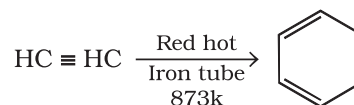
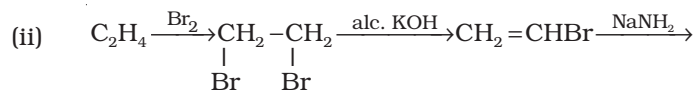
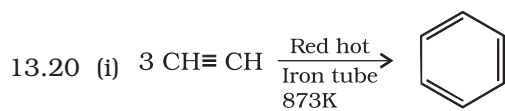
13.12 Lack of delocalisation of $(4n+2)$ π electrons in the cyclic system.

13.13 (i)



(ii)





13.22 (a) Chlorobenzene > *p*-nitrochlorobenzene > 2,4 - dinitrochlorobenzene

(b) Toluene > *p*-CH₃-C₆H₄-NO₂ > *p*-O₂N-C₆H₄-NO₂

13.23 Toluene undergoes nitration most easily due to electron releasing nature of the methyl group.

13.24 FeCl₃

13.25 Due to the formation of side products. For example, by starting with 1-bromopropane and 1-bromobutane, hexane and octane are the side products besides heptane.

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