

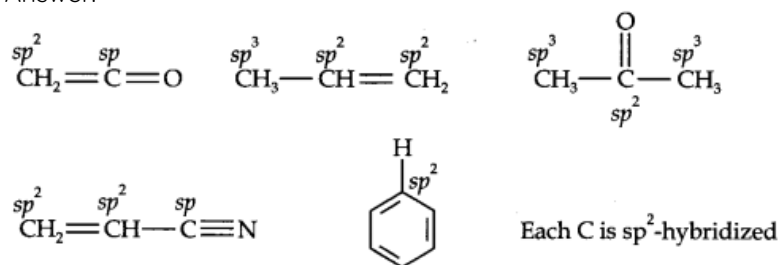


TEXTBOOK QUESTIONS SOLVED

Question 1. What are hybridisation states of each carbon atom in the following compounds?

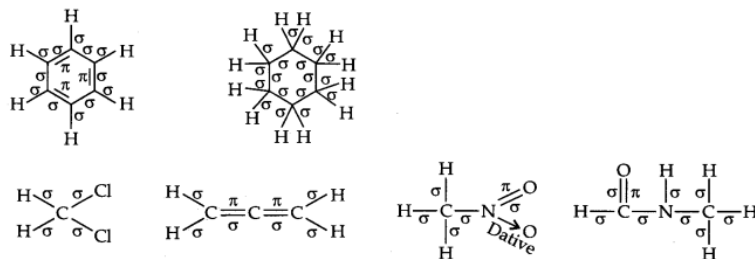
$\text{CH}_2=\text{C}=\text{O}$, $\text{CH}_3\text{CH}=\text{CH}_2$, $(\text{CH}_3)_2\text{CO}$, $\text{CH}_2=\text{CHCN}$, C_6H_6 .

Answer:



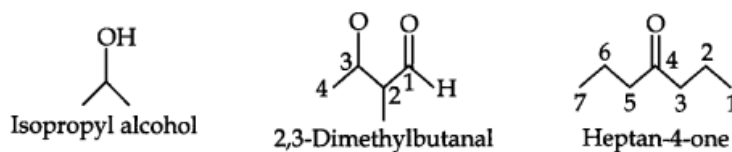
Question 2. Indicate the σ - and π -bonds in the following molecules: C_6H_6 , C_6H_{12} , CH_2Cl_2 , $\text{CH}=\text{C}=\text{CH}_2$, CH_3NO_2 , HCONHCH_3

Answer:

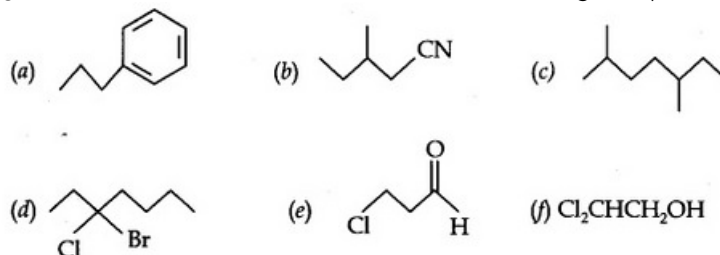


Question 3. Write bond-line formulas for: Isopropyl alcohol, 2,3-Dimethylbutanal, Heptan-4-one.

Answer:



Question 4. Give the IUPAC names of the following compounds:



Answer:

- Propylbenzene
- 3-Methylpentanenitrile
- 2,5-Dimethylheptane
- 3-Bromo-3-chloroheptane
- 3-Chloropropanal

(f) 2, 2-Dichloroethanol

Question 5. Which of the following represents the correct IUPAC name for the compounds concerned?

- (a) 2, 2-Dimethylpentane or 2-Dimethylpentane
- (b) 2, 4, 7-Trimethyloctane or 2, 5, 7-Trimethyloctane
- (c) 2-Chloro-4-methylpentane or 4-Chloro-2-methylpentane
- (d) But-3-yn-1-ol or But-4-ol-yne.

Answer:

- (a) 2, 2-Dimethylpentane
- (b) 2, 4, 7-Trimethyloctane. For two alkyl groups on the same carbon its locant is repeated twice, 2, 4, 7-locant set is lower than 2, 5, 7.
- (c) 2-Chloro-4-methylpentane. Alphabetical order of substituents.
- (d) But-3-yn-1-ol. Lower locant for the principal functional group, i.e., alcohol.

Question 6. Draw formulas for the first five members of each homologous series beginning with the following compounds,

- (a) $\text{H}-\text{COOH}$
- (b) CH_3COCH_3
- (c) $\text{H}-\text{CH}=\text{CH}_2$

Answer:

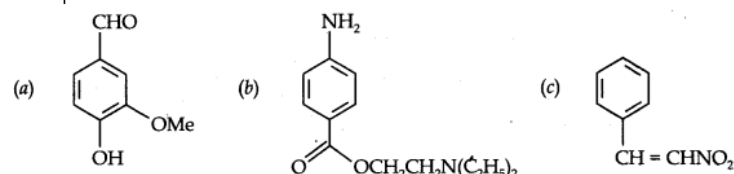
- (a) CH_3-COOH
 $\text{CH}_3\text{CH}_2-\text{COOH}$ $\text{CH}_3\text{CH}_2\text{CH}_2-\text{COOH}$
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2-\text{COOH}$
- (b) CH_3COCH_3
 $\text{CH}_3\text{COCH}_2\text{CH}_3$
 $\text{CH}_3\text{COCH}_2\text{CH}_2\text{CH}_3$
 $\text{CH}_3\text{COCH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
 $\text{CH}_3\text{CO}(\text{CH}_2)_4\text{CH}_3$
- (c) $\text{H}-\text{CH}=\text{CH}_2$
 $\text{CH}_3\text{CH}=\text{CH}_2$
 $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}=\text{CH}_2$
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}=\text{CH}_2$

Question 7. Give condensed and bond line structural formulas and identify the functional group(s) present, if any, for: (a) 2, 2, 4-Trimethylpentane (b) 2-Hydroxy-1, 2, 3-propanetricarboxylic acid (c) Hexanedial.

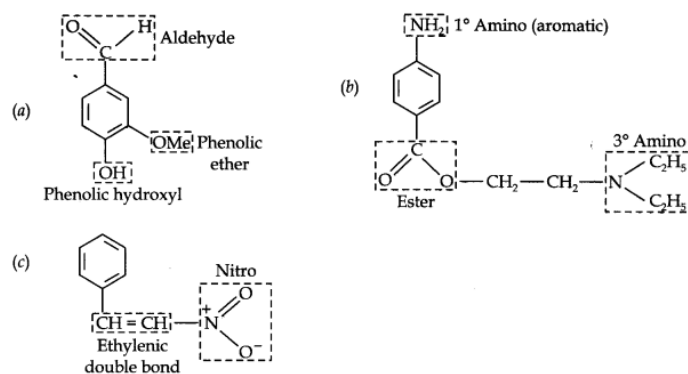
Answer:

Condensed formula	Bond line formula	Functional group/s
(a) $(\text{CH}_3)_3\text{CCH}_2\text{CH}(\text{CH}_3)_2$		—
(b) $\text{HOOCCH}_2\text{C}(\text{OH})(\text{COOH})\text{CH}_2\text{COOH}$		$\text{—}\overset{\text{O}}{\parallel}\text{C—OH}$ (carboxyl) and —OH (hydroxyl)
(c) $\text{OHC}(\text{CH}_2)_4\text{CHO}$		$\text{—}\overset{\text{O}}{\parallel}\text{C—H}$ (aldehyde)

Question 8. Identify the functional groups in the following compounds:



Answer:

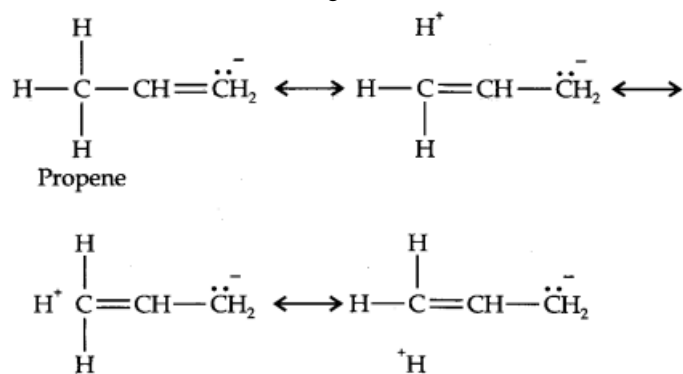


Question 9. Which of the two: $\text{O}_2\text{NCH}_2\text{CH}_2\text{O}^-$ or $\text{CH}_3\text{CH}_2\text{O}^-$ is expected to be more stable and why?

Answer: $\text{O}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{O}^-$ is more stable than $\text{CH}_3\text{CH}_2\text{O}^-$ because NO_2 group has -I-effect and hence it tends to disperse the -ve charge on the O-atom. In contrast, CH_3CH_2 has +I-effect. It, therefore, tends to intensify the -ve charge and hence destabilizes it.

Question 10. Explain why alkyl groups act as electron donors when attached to a π -system.

Answer: Due to hyperconjugation, alkyl groups act as electron donors when attached to a π -system as shown below:



***** END *****