

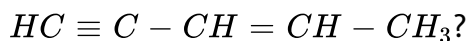
## CHEMISTRY

### BOOKS - MTG CHEMISTRY (ENGLISH)

#### ORGANIC CHEMISTRY-SOME BASIC PRINCIPLES AND TECHNIQUES

##### Mcqs

1. How many  $\sigma$  and  $\pi$  bonds are present in

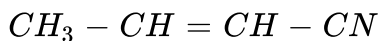


- A.  $9\sigma, 4\pi$
- B.  $10\sigma, 3\pi$
- C.  $6\sigma, 6\pi$
- D.  $5\sigma, 5\pi$

**Answer: B**

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2. Which type of hybridisation of each carbon is there in the compound?



A.  $sp^3$ ,  $sp^2$ ,  $sp^2$ ,  $sp$

B.  $sp^3$ ,  $sp^2$ ,  $sp^2$ ,  $sp^3$

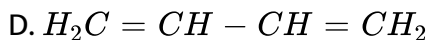
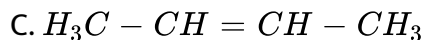
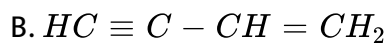
C.  $sp^3$ ,  $sp^2$ ,  $sp^3$ ,  $sp^3$

D.  $sp^3$ ,  $sp^2$ ,  $sp$ ,  $sp^3$

**Answer: A**

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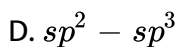
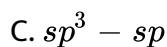
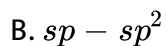
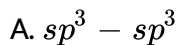
3. Which of the following represents the given sequence of hybridisation of carbon atoms from left to right  $sp^2$ ,  $sp^2$ ,  $sp$ ,  $sp^?$



**Answer: A**

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4. The hybridisation of carbons of C-C single bond of  $HC \equiv C - CH = CH_2$  is



**Answer: B**

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5. What are the hybridization and shapes of the following molecules?

(i)  $CH_3F$

(ii)  $HC \equiv N$

A. (i)  $sp^2$ , trigonal planar, (ii)  $sp^3$ , tetrahedral

B. (i)  $sp^3$ , tetrahedral, (ii)  $sp$ , linear

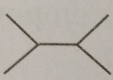
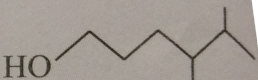
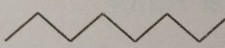
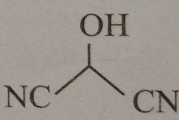
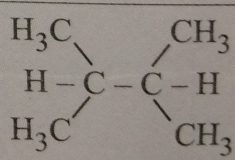
C. (i)  $sp$ , linear, (ii)  $sp^2$ , trigonal planar

D. (i)  $sp^2$ , trigonal planar, (ii)  $sp^2$ , trigonal planar

**Answer: B**

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6. Match the column I with column II and mark the appropriate choice.

Column I		Column II	
(A)	$\text{N} \equiv \text{C} - \underset{\text{OH}}{\text{CH}} - \text{C} \equiv \text{N}$	(i)	$\text{CH}_3(\text{CH}_2)_6\text{CH}_3$
(B)		(ii)	
(C)		(iii)	
(D)	$\text{HO}(\text{CH}_2)_3 - \underset{\text{CH}_3}{\text{CH}} - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3$	(iv)	

A.  $A \rightarrow iii, B \rightarrow iv, C \rightarrow i, D \rightarrow ii$

B.  $A \rightarrow iv, B \rightarrow iii, C \rightarrow ii, D \rightarrow i$

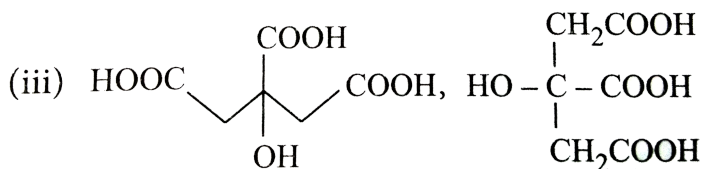
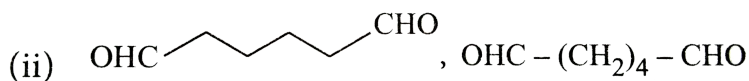
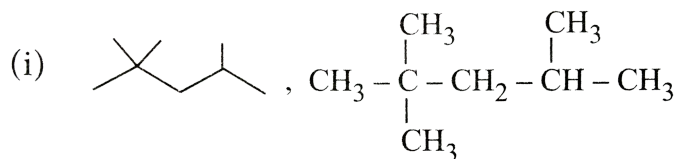
C.  $A \rightarrow i, B \rightarrow ii, C \rightarrow iv, D \rightarrow iii$

D.  $A \rightarrow ii, B \rightarrow iii, C \rightarrow i, D \rightarrow iv$

Answer: A

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7. Which of the following correctly matched the bond line and condensed structure of the compounds ?



A. (i) only

B. (ii) only

C. (i) and (ii) only

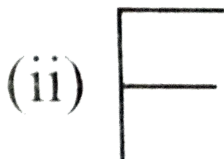
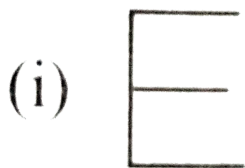
D. (i),(ii) and (iii)

Answer: D



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8. IUPAC names of the given structure are

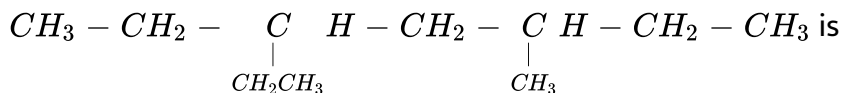


- A. (i) hexane, (ii) 3-methylbutane  
B. (i) isopentane, (ii) 2,3-dimethylbutane  
C. (i) 3-ethylbutane, (ii) isopentane  
D. (i) 3-methylpentane, (ii)-methylbutane.

Answer: D

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9. Correct name for the given compound

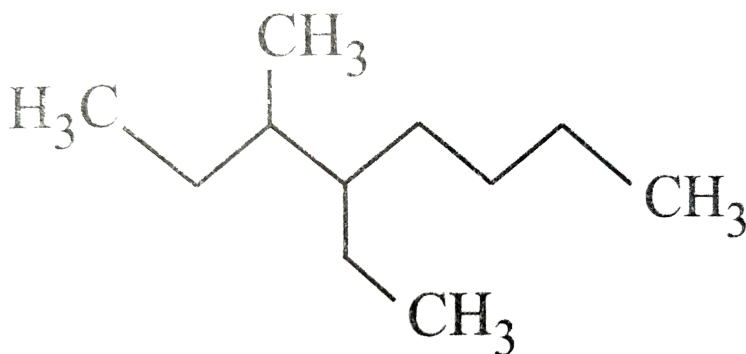


- A. 3-ethyl-5-methylheptane
- B. 5-ethyl-3-methylheptane
- C. 1,1-diethyl-3-methylpentane
- D. 3-methyl-5,5-diethylpentane

**Answer: A**

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10. IUPAC name of the compound



- A. 2,3-dimethylheptane
- B. 3-methyl-4-ethyloctane



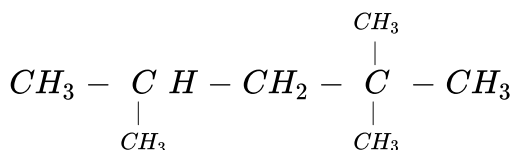
C. 5-ethyl-6-methyloctane

D. 4-ethyl-3-methyloctane.

**Answer: D**

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11. How many primary, secondary, tertiary and quaternary carbon atoms are present in the following compound?



A. One primary, two secondary and one tertiary

B. Five primary, three secondary

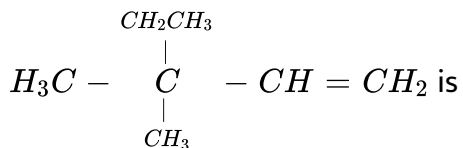
C. Five primary, one secondary, one tertiary and one quaternary

D. four primary, two secondary and two quaternary

**Answer: C**

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12. The IUPAC name of the compound having formula



- A. 3,3,3-trimethylprop-1-ene
- B. 1,1,1-trimethylprop-2-ene
- C. 3,3-dimethylpent-1-ene
- D. 2,2-dimethylbut-3-ene.

**Answer: C**



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13. IUPAC name of  $(CH_3)_3C - CH = CH_2$  is

- A. 2,2-dimethylbut-3-ene
- B. 2,2-dimethylpent-4-ene

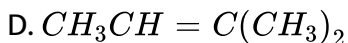
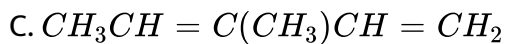
C. 3,3-dimethylbut-1-ene

D. hex-1-ene

**Answer: C**

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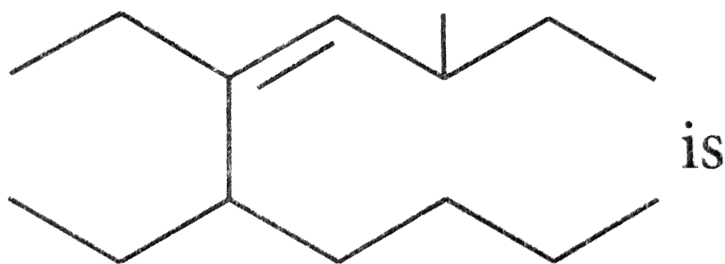
14. Which of the following represents 3-methylpenta-1,3-diene?



**Answer: C**

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15. The correct IUPAC name of the compound

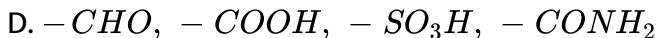
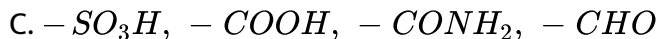
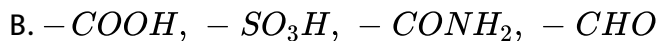
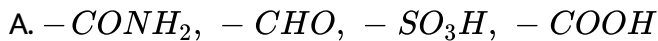


- A. 3-heptyl-5-methylhept-3-ene
- B. 5,6-diethyl-3-methyldec-4-ene
- C. 5-butyl-3-methyloct-4-ene
- D. 8-methyl-3-propylhex-3-ene

**Answer: B**

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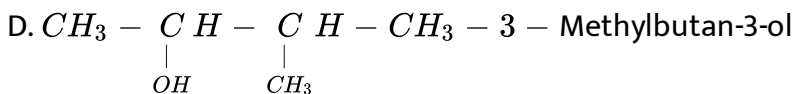
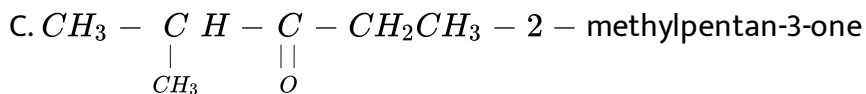
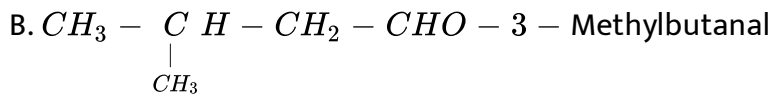
16. The correct decreasing order of priority for the functional groups of organic compounds in the IUPAC system of nomenclature is



Answer: B

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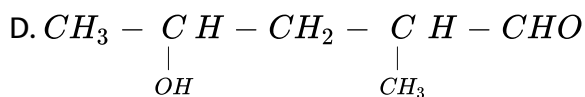
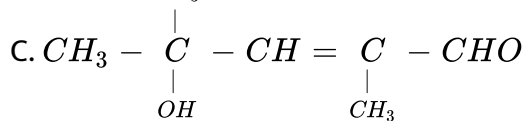
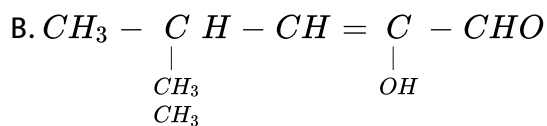
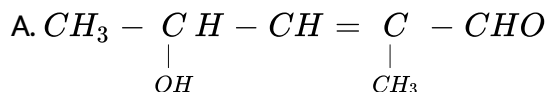
17. Which of the following compounds is not correctly matched with its IUPAC name?



Answer: D

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18. The correct representation of 4-hydroxy-2-methylpent-2-en-1-al is



Answer: A

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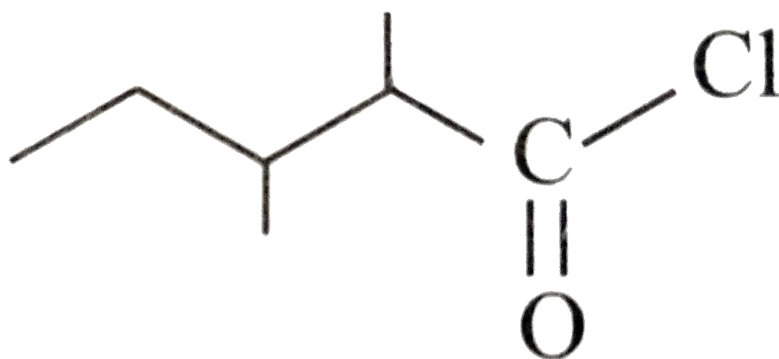
19. The correct name of  $CH_3CH_2 - \underset{\substack{|| \\ O}}{C} - \underset{\substack{| \\ CN}}{C}H - CHO$  is

- A. 2-cyano-3-oxopentanal
- B. 2-formyl-3-oxopentanenitrile
- C. 2-cyano-1,3-pentadiene
- D. 1,3-dioxo-2-cyanopentane

Answer: B

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20. The IUPAC name of



is

A. 1-chloro-1-oxo-2,3-dimethylpentane

B. 2-ethyl-3-methylbutanoyl chloride

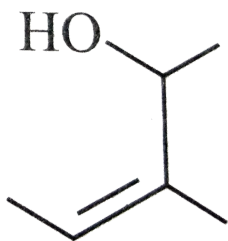
C. 2,3-dimethylpentanoyl chloride

D. 3,4-dimethylpentanoyl chloride.

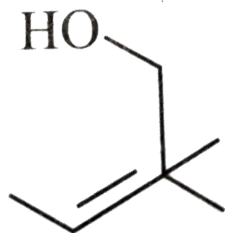
**Answer: C**

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21. Correct representation of 3-methylpent-3-en-2-ol is



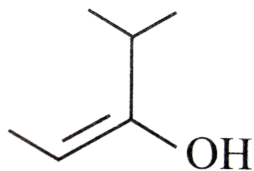
A.



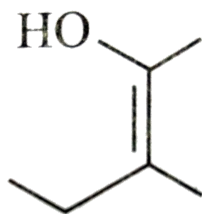
B.



C.



D.



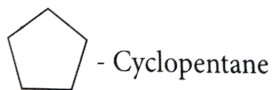
**Answer: A**



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**22. Which of the following IUPAC name is not correctly matched?**

A.



- Cyclopentane

B.

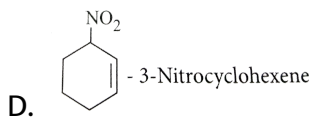


- Chlorocyclohexane

C.



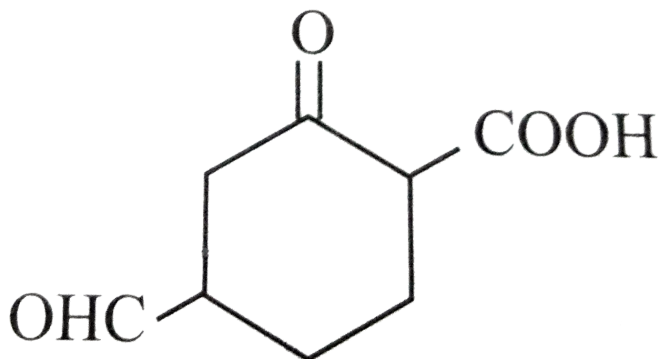
- 1,1-dimethylcyclohexane



**Answer: C**

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23. The correct IUPAC name of the compound



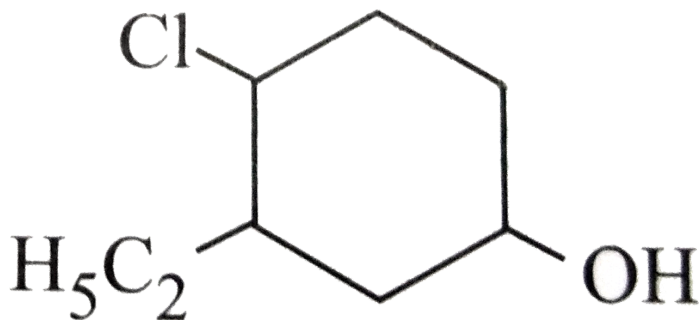
is

- A. 4-formyl-2-oxocyclohexanecarboxylic acid
- B. 4-carboxy-2-oxocyclohexanal
- C. 4-carboxy-1-formylcyclohexanone
- D. 2-carboxy-5-formyl-1-oxocyclohexane

Answer: A

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24. The correct IUPAC name of the following compound is

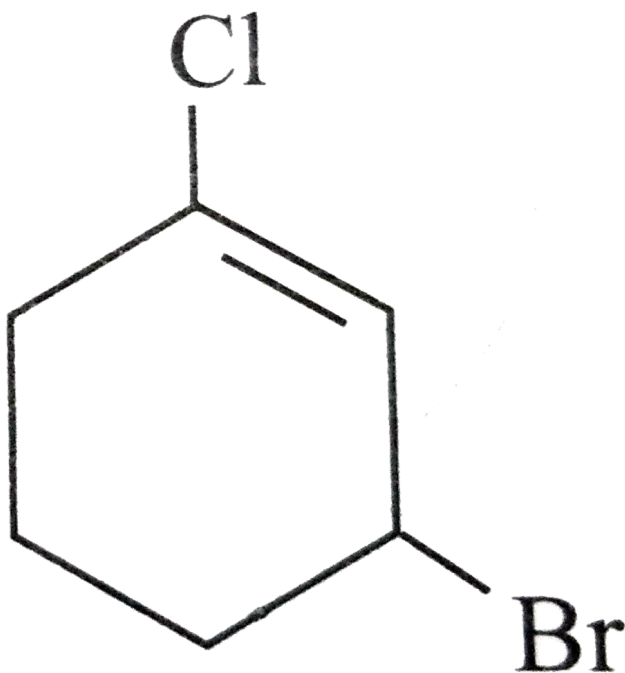


- A. 2-ethyl-1-chlorocyclohexanol
- B. 4-chloro-5-ethylcyclohexanol
- C. 4-hydroxy-2-ethyl-1-chlorocyclohexane
- D. 4-chloro-3-ethylcyclohexanol

Answer: D

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25. The IUPAC name of the compound shown below is

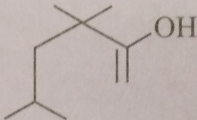
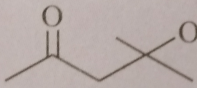
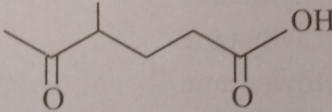
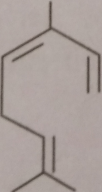


- A. 2-bromo-6-chlorocyclohex-1-ene
- B. 6-bromo-2-chlorocyclohexene
- C. 3-bromo-1-chlorocyclohexene
- D. 1-bromo-3-chlorocyclohexene

**Answer: C**



26. Match the compounds given in column I with the IUPAC names given in column II and mark the appropriate choice.

	Column I		Column II
(A)		(i)	3,7-Dimethylocta-1,3,6-triene
(B)		(ii)	4-Methyl-5-oxohexanoic acid
(C)		(iii)	3,3,5-Trimethylhex-1-en-2-ol
(D)		(iv)	4-Hydroxy-4-methylpentan-2-one

A.  $A \rightarrow ii, B \rightarrow i, C \rightarrow iii, D \rightarrow iv$

B.  $A \rightarrow iv, B \rightarrow ii, C \rightarrow i, D \rightarrow iii$

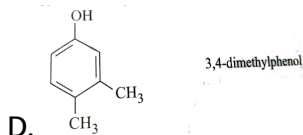
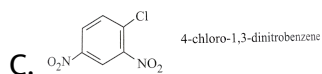
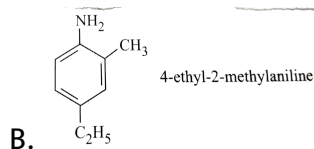
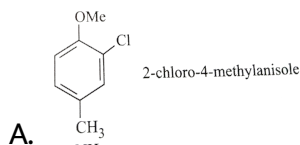
C.  $A \rightarrow i, B \rightarrow iii, C \rightarrow ii, D \rightarrow iv$

D.  $A \rightarrow iii, B \rightarrow iv, C \rightarrow ii, D \rightarrow i$

**Answer: D**

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27. Which of the following names of substituted benzene compounds is not correct?



**Answer: C**

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28. What is the minimum number of carbon atoms of an alkane must have to form an isomer?

- A. 4
- B. 3
- C. 2
- D. 1

**Answer: A**

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29. 1-Butene and cyclobutane show

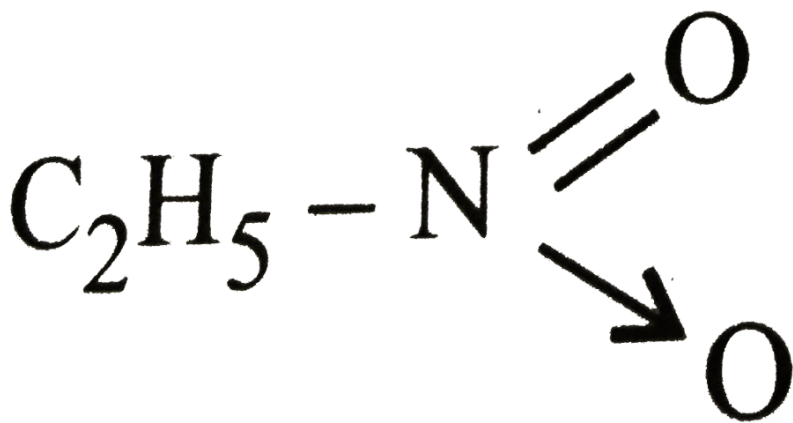
- A. position isomerism
- B. ring-chain isomerism

C. functional isomerism

D. metamerism

**Answer: B**

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30.

and

$C_2H_5 - O - N = O$  are examples of

A. functional isomers

B. tautomers

C. position isomers

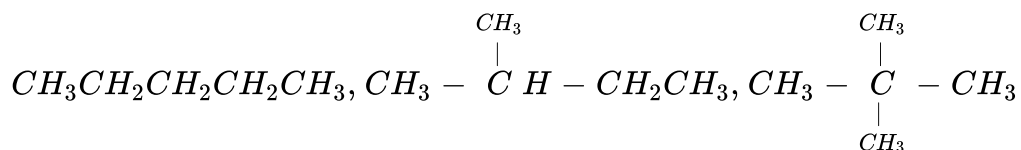


D. metamers

Answer: A

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31. The type of isomerism shown by the following compounds is



- A. position isomerism
- B. metamerism
- C. ring-chain isomerism
- D. chain isomerism

Answer: D

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32. Which of the following is an isomer of ethanol?

A. Methanol

B. Acetone

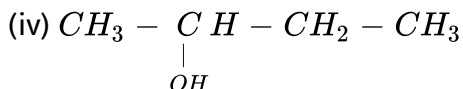
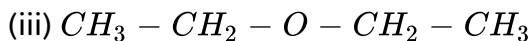
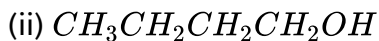
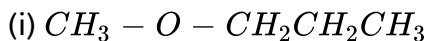
C. Diethylether

D. Dimethylether

Answer: D

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33. Given below are the structures of few compounds with molecular formula  $C_4H_{10}O$ . Select metamers from these structures.



A. (i) and (ii)

B. (ii) and (iii)

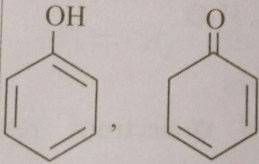
C. (i) and (iii)

D. (ii) and (iv)

**Answer: C**

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**34.** Match the column I with column II and mark the appropriate choice.

Column I		Column II	
(A)	$\text{CH}_3\text{CH}_2\text{OH}$ , $\text{H}_3\text{C} - \text{O} - \text{CH}_3$	(i)	Position isomers
(B)	$\text{C}_2\text{H}_5\text{COC}_2\text{H}_5$ , $\text{C}_3\text{H}_7\text{COCH}_3$	(ii)	Tautomers
(C)		(iii)	Functional isomers
(D)	$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ , $\text{CH}_3 - \underset{\text{OH}}{\text{CH}} - \text{CH}_3$	(iv)	Metamers

A.  $A \rightarrow iv$ ,  $B \rightarrow iii$ ,  $C \rightarrow i$ ,  $D \rightarrow ii$

B.  $A \rightarrow i, B \rightarrow iii, C \rightarrow ii, D \rightarrow iv$

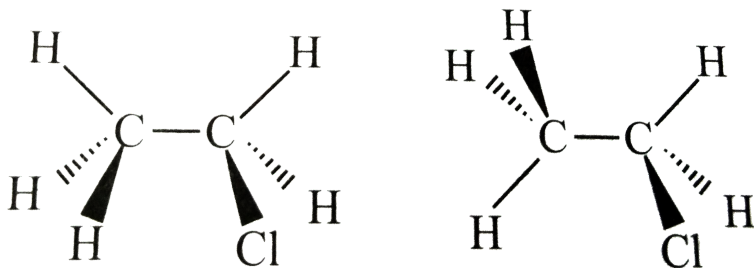
C.  $A \rightarrow iii, B \rightarrow iv, C \rightarrow ii, D \rightarrow i$

D.  $A \rightarrow iv, B \rightarrow i, C \rightarrow ii, D \rightarrow iii$

**Answer: C**

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35. What is the relationship between the structures shown ?



A. Structural isomers

B. Geometrical isomers

C. Conformational structure

D. Identical structures

**Answer: C**

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36. Which of the following compounds is isomeric with 2,2,4,4-tetramethylhexane?

- A. 3-ethyl-2,2-dimethylpentane
- B. 4-isopropylheptane
- C. 4-ethyl-3-methyl-4-n-propyloctane
- D. 4,4-diethyl-3-methylheptane

**Answer: B**

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37. Heterolysis of a carbon-chlorine bond produces

- A. two free radicals
- B. two carbocations
- C. one cation and one anion
- D. two carbanions.

**Answer: C**

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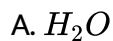
**38.** Which of the followingg intermediates contains three paris of electrons in its valence shell?

- A. Carbocations
- B. Carbanions
- C. Free radicals
- D. Both (a) and (b)

**Answer: A**

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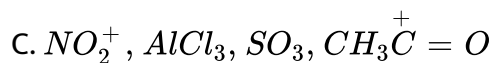
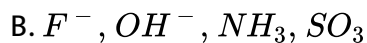
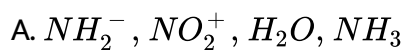
39. which of the following is an electrophilic reagent?



Answer: D

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40. Which of the following sets of groups contains only electrophiles?



D.  $NH_3$ ,  $BF_3$ ,  $AlCl_3$ ,  $H_2O$

**Answer: C**

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**41.** Inductive effect involves

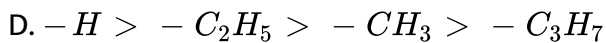
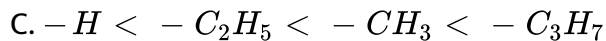
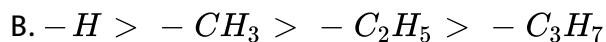
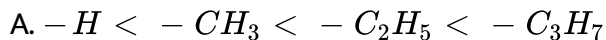
- A. displacement of  $\sigma$ -electrons resulting in polarisation
- B. displacement of  $\pi$ -electrons resulting in polarisation
- C. delocalisation of  $\sigma$ -electrons
- D. delocalisation of  $\pi$ -electrons.

**Answer: A**

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42. The increasing order of electron donating inductive effect of alkyl groups is



Answer: A



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43. Inductive effect of which atom is taken as zero to compare inductive effect of other atoms?

A. Hydrogen

B. Chlorine

C. carbon

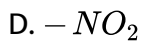
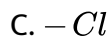
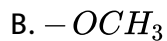
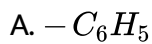
D. oxygen

**Answer: A**



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**44.** Maximum -I effect is exerted by the group



**Answer: D**



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45. Which one of the following acids would you expect to be the strongest?

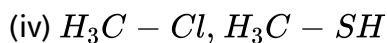
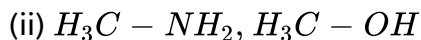
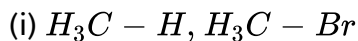


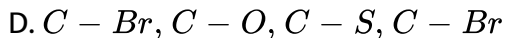
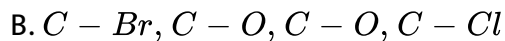
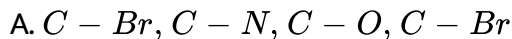
Answer: D



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46. Few pairs of molecules are given below. Which bond of the molecule of the pairs is more polar?



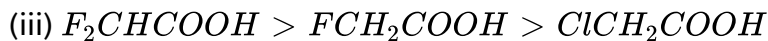
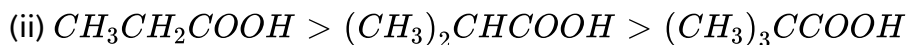


**Answer: B**



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**47.** Which of the following is the correct order of acidity of carboxylic acids?



A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (i), (ii) and (iii)

**Answer: D**

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**48.** Point out the incorrect statement about resonance?

A. Resonance structures should have equal energy

B. In resonance structures, the constituent atoms must be in the same position

C. In resonance structures, there should not be same number of electron pairs

D. Resonance structures should differ only in the location of electrons around the constituent atoms.

**Answer: C**

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- A. Ethoxide
- B. Phenoxide
- C. Butoxide
- D. Isopropoxide

**Answer: B**

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**51. Hyperconjugation is**

- A.  $\sigma - \pi$  conjugation
- B. noticed due to delocalisation of  $\sigma$  and  $\pi$  bond
- C. no bond resonance
- D. all the above

**Answer: D**

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52. Stability of iso-butylene can be best explained by

- A. inductive effect
- B. mesomeric effect
- C. hyperconjugative effect
- D. steric effect

Answer: C

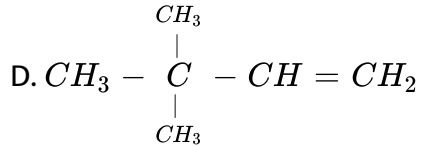


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53. Which of the following is true ?

- A.  $CH_3 - \bar{C}H_2$
- B.  $C_6H_5 - CH_3$
- C.  $CH_2 = CH_2$

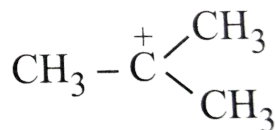
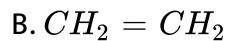
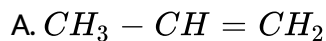




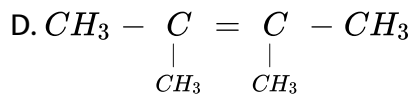
Answer: B

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54. Hyperconjugation is not possible in



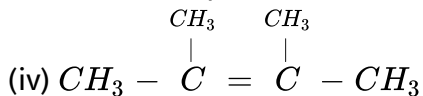
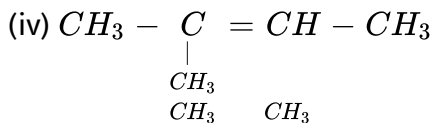
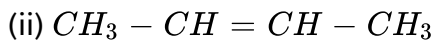
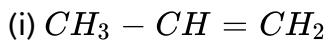
C.



Answer: B

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55. Decreasing order of stability of following alkenes is



A. (i)>(ii)>(iii)>(iv)

B. (iv)>(iii)>(ii)>(i)

C. (iii)>(ii)>(i)>(iv)

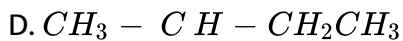
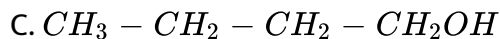
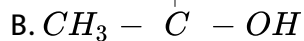
D. (ii)>(iii)>(iv)>(i)

**Answer: B**



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56. Which of the following alcohols on dehydration gives most stable carbocation?



**Answer: B**



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57. Stability of alkyl carbocations can be explained by

A. inductive effect only

B. hyperconjugation only

C. both inductive effect and hyperconjugation

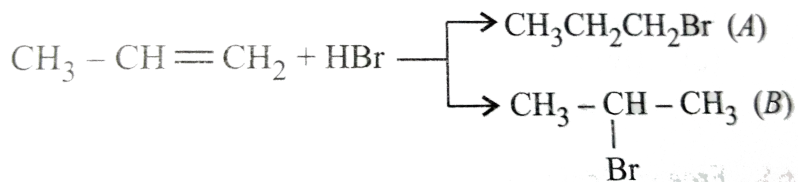
D. electromeric effect only

**Answer: C**



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58. In the given reaction two products are expected.



The product (B) is formed as a major product because

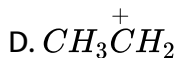
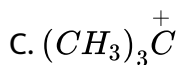
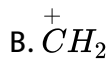
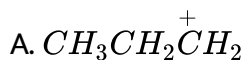
- A. the carbocation  $\text{CH}_3 - \overset{+}{\text{C}}\text{H} - \text{CH}_3$  is formed which is more stable
- B. the carbocation  $\text{CH}_3 - \text{CH}_2 - \overset{+}{\text{C}}\text{H}_2$  is formed which is more stable
- C. both carbocations are equally stable but the nucleophile attacks on central C atom
- D.  $\text{CH}_3 - \overset{+}{\text{C}}\text{H} - \text{CH}_3$  can easily give a proton to attack  $\text{Br}^+$ .

Answer: A



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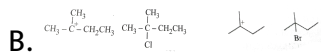
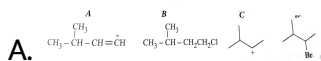
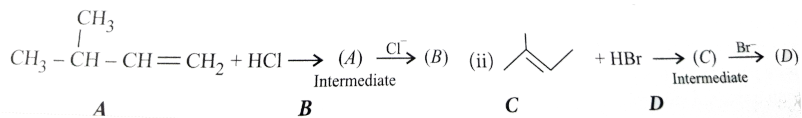
59. The carbocation  $\text{CH}_3\overset{+}{\text{C}}\text{HCH}_3$  is less stable than

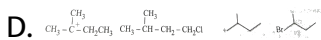
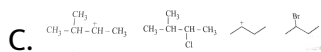


Answer: C

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60. Complete the following reactions by filling most stable intermediate and the product.





**Answer: B**

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61. Which of the following statements is not true about the stability of carbanions?

A. Stability of carbanions because with increase in s-character of orbital

B. The electron withdrawing groups like  $-\text{NO}_2$ ,  $-\text{CN}$ ,  $>\text{C}=\text{O}$  increases the stability of carbanions.

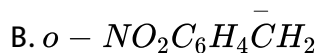
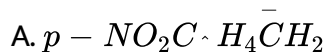
C. Order of stability of carbanions is  $3^\circ > 2^\circ > 1^\circ$ ,

D. The negatively charged carbon is  $sp^3$  hybridised and pyramidal.

**Answer: C**

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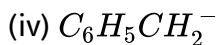
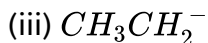
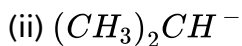
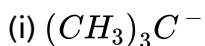
62. Which of the following carbanion expected to be most stable?



Answer: B

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63. The order of decreasing stability of the following carbanions is



A. (i)gt(ii)gt(iii)gt(iv)

B. (iv)gt(iii)gt(ii)gt(i)

C. (iv)gt(i)gt(ii)gt(iii)

D. (iii)gt(ii)gt(i)gt(Iv)

**Answer: B**

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**64.** Free radicals can undergo

A. rearrangement to a more stable free radical

B. decomposition to give another free radical

C. combination with other free radical

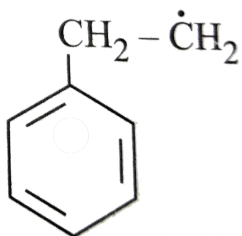
D. all are correct

**Answer: D**

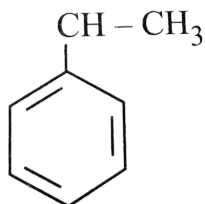
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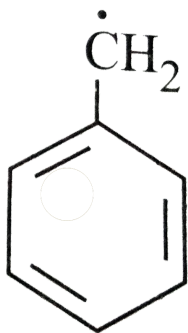
65. The most stable free radical among the following is



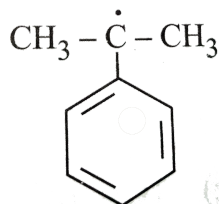
A.



B.



C.



D.

**Answer: D**

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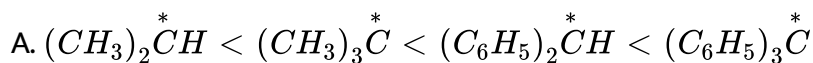
**66.** Which of the following is a characteristic feature of a free radical?

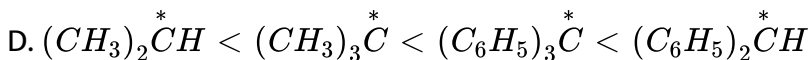
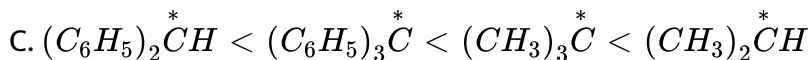
- A. It has a positive charge
- B. It has a negative charge
- C. It has all paired electrons.
- D. It has an unpaired electron.

**Answer: D**

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**67.** The increasing order of stability of the following free radicals is





**Answer: A**

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**68.** Which of the following is a false statement?

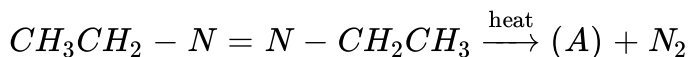
- A. Free radicals, carbonium ions or carbanions are reaction intermediates.
- B. Reaction between methane and chlorine in presence of sunlight proceeds via free radical
- C. The electronegative atom in the carbon chain produces +I effect
- D. Homolytic fission of C-C bonds gives free radicals

**Answer: C**



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69. Which type of intermediate (A) is formed during the reaction?



A. Carbocation

B. Carbanions

C. Free radical

D. Carbene

Answer: C



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70. Separation of two substances by crystallisation depends upon their differences in

A. densities

B. solubility

C. melting points

D. boiling points

**Answer: B**



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71. Those substances can be separated by steam distillation which are

A. steam volatile and insoluble in water

B. steam volatile and soluble in water

C. steam volatile and sparingly soluble in water

D. in liquid form in steam and solid form in water.

**Answer: A**



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72. Glycerine can be purified by

- A. vacuum distillation
- B. simple distillation
- C. steam distillation
- D. fractional distillation

**Answer: A**



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73. Few mixtures and their methods of separation are given in the columns I and columns II respectively. Match the columns and mark the

appropriate choice.

Column I		Column II	
(A)	Ether + Toluene	(i)	Steam distillation
(B)	<i>o</i> -Nitrophenol + <i>p</i> -Nitrophenol	(ii)	Distillation
(C)	Benzoic acid + Benzaldehyde	(iii)	Fractional distillation
(D)	Fractions of crude oil	(iv)	Sublimation

A.  $A \rightarrow iii, B \rightarrow ii, C \rightarrow i, D \rightarrow iv$

B.  $A \rightarrow ii, B \rightarrow iii, C \rightarrow i, D \rightarrow iv$

C.  $A \rightarrow ii, B \rightarrow i, C \rightarrow iv, D \rightarrow iii$

D.  $A \rightarrow i, B \rightarrow iii, C \rightarrow ii, D \rightarrow iv$

**Answer: C**



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**74.** Distillation under reduced pressure is generally used to purify those liquids which

A. have very low boiling points

B. are volatile

C. have high boiling points and which decompose below their boiling points

D. have a large difference in their boiling points

**Answer: C**

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**75.** Which method can be applied to separate a mixture of camphor and benzoic acid?

A. Sublimation

B. Chemical methods

C. Crystallisation

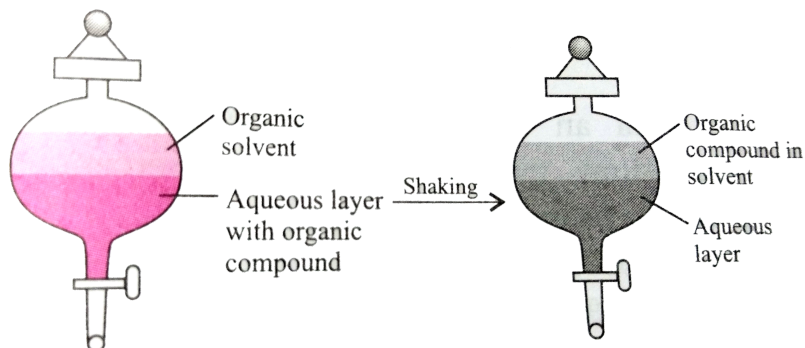
D. Extraction with solvent



Answer: B

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76. The process of separation of an organic compound from its aqueous solution by shaking with a suitable solvent is termed solvent extraction or differential extraction.



The organic compound present in the aqueous layer moves to the organic solvent because

- A. The organic substance is more soluble in the organic solvent
- B. organic compound being lighter moves in the upper layer

C. organic solvent is insoluble in water hence organic compound

moves up

D. from the supersaturated aqueous solution the solute starts

diffusing

**Answer: A**



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77. The substance which can be used as adsorbent in column chromatography is

A.  $Na_2O$

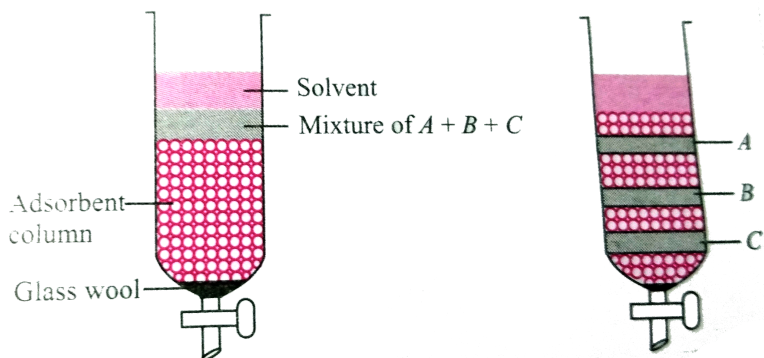
B.  $Na_2SO_4$

C.  $Al_2O_3$

D.  $NaCl$

**Answer: C**

78. Given below is a column of adsorbent in which the mixture of compounds  $A+B+C$  is placed. When the solvent is poured through the column, the components are separated depending upon the degree of adsorption. Which of the given statements is correct?



A. A is the most weakly adsorbed component hence remains near the top

B. A is the most strongly adsorbed component hence remains near the top

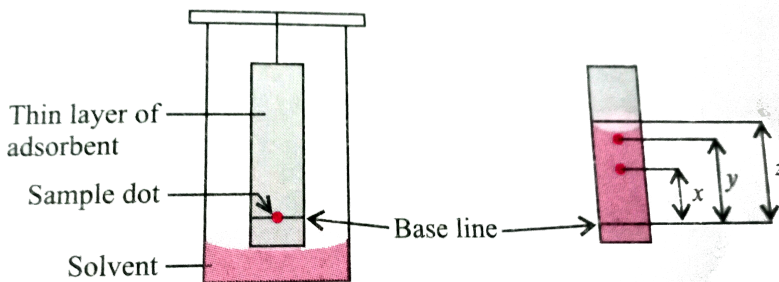
C. C is the most strongly adsorbed component hence is found near the bottom

D. B is the most strongly adsorbed component hence is found in the centre of the column.

**Answer: B**

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79. Given below is the developed chromatogram of a mixture of pigments.



$R_f$  values for  $x$  and  $y$  can be expressed as

A.  $\frac{x}{z}, \frac{y}{z}$

B.  $\frac{x}{y}, \frac{y}{z}$

C.  $xz, yz$

D.  $\frac{z}{x}, \frac{z}{y}$

**Answer: A**



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**80.** The presence of carbon in an organic compound can be shown by

A. heating the compound with sodium

B. heating the compound with cupric oxide

C. heating the compound on bunsen flame

D. heating the compound with magnesium

**Answer: B**



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81. In Lassaigne's test for N,S and halogens, the organic compound is

- A. fused with sodium
- B. dissolved with sodamide
- C. extracted with sodamide
- D. fused with calcium

**Answer: A**

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82. The blue compound formed in the positive test for nitrogen with Lassaigne solution of an organic compound is

- A.  $Na_4[Fe(CN)_5(NOS)]$
- B.  $Na_3[Fe(CN)_6]$
- C.  $Fe(CN)_3$
- D.  $Fe_4[Fe(CN)_6]_3$

**Answer: D**



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**83.** If on adding  $FeCl_3$  solution to acidified Lassaigne solution, a blood red colouration is produced, it indicates the presence of

A. S

B. N

C. N and S

D. S and Cl

**Answer: C**



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**84.** During sodium extract preparation for Lassaigne's test both N and S present in organic compound change to

A.  $\text{NaCN}$  and  $\text{Na}_2\text{S}$

B.  $\text{NaNH}_2$  and  $\text{Na}_2\text{SO}_4$

C.  $\text{NaSCN}$

D.  $\text{NaNO}_3$  and  $\text{Na}_2\text{S}$ .

**Answer: C**

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**85.** Lassaigne's test for the detection of nitrogen fails in

A.  $\text{NH}_2\text{CONHNH}_2 \cdot \text{HCl}$

B.  $\text{NH}_2\text{NH}_2 \cdot \text{HCl}$

C.  $\text{NH}_2\text{CONH}_2$

D.  $\text{C}_6\text{H}_5\text{NHNH}_2 \cdot \text{HCl}$

**Answer: B**

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86. Freshly prepared solution of sodium nitroprusside is added to the sodium extract. Appearance of a deep violet colour indicates the presence of

- A. nitrogen
- B. sulphur
- C. both nitrogen and sulphur
- D. halogen

**Answer: B**



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87. Which of the following will not give a white pt. when  $AgNO_3$  is added to its solution?

- A.  $CCl_4$

B.  $\text{NaCl}$

C.  $\text{MgCl}_2$

D.  $\text{KCl}$

**Answer: A**



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**88.** 0.92 g of an organic compound was analysed by combustion method. The mass of the U-tube increased by 1.08 g. what is the percentage of hydrogen in the compound?

A. 0.1304

B. 0.5217

C. 0.6521

D. 0.113

**Answer: A**



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89. An organic compound gave 0.4655 g of  $CO_2$  on complete combustion. If the mass of the compound taken was 0.2115g, what is the percentage of C in it?

- A. 0.133
- B. 0.2667
- C. 0.6003
- D. 0.288

Answer: C



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90. In Duma's method 0.52g of an organic compound on combustion gave 68.6 mL  $N_2$  at  $27^\circ C$  and  $756mm$  pressure. What is the percentage of nitrogen in the compound?

A. 0.1222

B. 0.1493

C. 0.1584

D. 0.1623

**Answer: B**



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91. In Kjeldahl's method of estimation of nitrogen, nitrogen is quantitatively converted to ammonium sulphate. It is then treated with standard solution of alkali. The nitrogen which is present is estimated as

A.  $N_2$  gas

B.  $NO_2$  gas

C.  $NH_3$  gas

D.  $(NH_4)_2SO_4$  ppt

**Answer: C**



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**92.** In Carium method of estimation of halgoen, 0.15 g of an organic compound gave 0.12 g of AgBr. What is the percentage of bromine in the compound?

A. 0.6808

B. 0.3504

C. 42.1 %

D. 0.5

**Answer: B**



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93. 2.18g of an organic compound containing sulphur produces 1.02 g of  $BaSO_4$ . The percentage of sulphur in the compound is

- A. 0.0726
- B. 0.0898
- C. 0.1
- D. 0.0642

**Answer: D**



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94. 1.6 g of an organic compound gave 2.6 g of magnesium pyrophosphate. The percentage of phosphorus in the compound is

- A. 0.4538
- B. 0.5438
- C. 0.3776

Answer: A

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95. Match the column I with column II and mark the appropriate choice.

Column I		Column II	
(A)	Beilstein test	(i)	Sulphur
(B)	Sodium nitroprusside	(ii)	Carbon
(C)	Liebig's method	(iii)	Nitrogen
(D)	Kjeldahl's method	(iv)	Chlorine

A.  $A \rightarrow i, B \rightarrow ii, C \rightarrow iii, D \rightarrow iv$

B.  $A \rightarrow iii, B \rightarrow ii, C \rightarrow i, D \rightarrow iv$

C.  $A \rightarrow iv, B \rightarrow i, C \rightarrow ii, D \rightarrow iii$

D.  $A \rightarrow ii, B \rightarrow iii, C \rightarrow iv, D \rightarrow i$

Answer: C



96. Match the column I with column II in which formula for estimation of an element is given and mark the appropriate choice.

Column I		Column II	
(A)	Estimation of carbon	(i)	$\frac{80}{188} \times \frac{w_1}{w} \times 100$
(B)	Estimation of nitrogen	(ii)	$\frac{62}{222} \times \frac{w_1}{w} \times 100$
(C)	Estimation of bromine	(iii)	$\frac{32}{233} \times \frac{w_1}{w} \times 100$
(D)	Estimation of sulphur	(iv)	$\frac{28}{22400} \times \frac{V}{w} \times 100$
(E)	Estimation of phosphorus	(v)	$\frac{12}{44} \times \frac{w_1}{w} \times 100$

A.  $A \rightarrow v, B \rightarrow ii, C \rightarrow iv, D \rightarrow i, E \rightarrow iii$

B.  $A \rightarrow v, B \rightarrow iv, C \rightarrow i, D \rightarrow iii, E \rightarrow ii$

C.  $A \rightarrow v, B \rightarrow iv, C \rightarrow ii, D \rightarrow i, E \rightarrow iii$

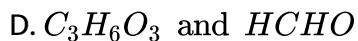
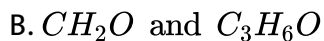
D.  $A \rightarrow iv, B \rightarrow iii, C \rightarrow i, D \rightarrow ii, E \rightarrow v$



**Answer: B**

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97. The masses of carbon, hydrogen and oxygen in an organic compound are in the ratio 6:1:8 respectively. Which of the following pairs of formulae correspond to above information?



**Answer: D**

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98. 0.2 g of an organic compound contains C, H and O. On combustion, it yields 0.15 g  $CO_2$  and 0.12 g  $H_2O$ . The percentage of C, H and O respectively is

- A.  $C = 15\%$  ,  $H = 20\%$  ,  $O = 65\%$
- B.  $C = 10\%$  ,  $H = 8.2\%$  ,  $O = 81.8\%$
- C.  $C = 12.2\%$  ,  $H = 8.8\%$  ,  $O = 79\%$
- D.  $C = 20\%$  ,  $H = 6.66\%$  ,  $O = 73.34\%$

**Answer: D**



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99. 0.92 g of an organic compound was analysed by combustion method. The mass of the U-tube increased by 1.08 g. what is the percentage of hydrogen in the compound?

- A.  $C = 52.17\%$  ,  $H = 13.04\%$  ,  $O = 34.79\%$

B.  $C = 50\%$  ,  $H = 50\%$

C.  $C = 32.19\%$  ,  $H = 18.01\%$  ,  $O = 49.8\%$

D.  $C = 72\%$  ,  $H = 28\%$

**Answer: A**

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**100.** An organic compound contains 69% carbon and 4.8% hydrogen, the remainder being oxygen. What will be the masses of carbon dioxide and water produced when 0.20 g of this substance is subjected to complete combustion.

A. 0.40g

B. 0.50g

C. 0.60g

D. 0.70g

**Answer: B**

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## Exemplar Problems

1. Which of the following is the correct IUPAC name?

- A. 3-Ethyl-4,4-dimethylheptane
- B. 4,4-Dimethyl-3-ethylheptane
- C. 5-Ethyl-4,4-dimethylheptane
- D. 4,4-Bis(methyl)-3-ethylheptane

**Answer: A**

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2. The IUPAC name for  $CH_3 - \overset{O}{\parallel}C - CH_2 - CH_2 - \overset{O}{\parallel}C - OH$  is \_\_\_\_\_.

A. 1-hydroxypentane-1,4-dione

B. 1,4-dioxopentanol

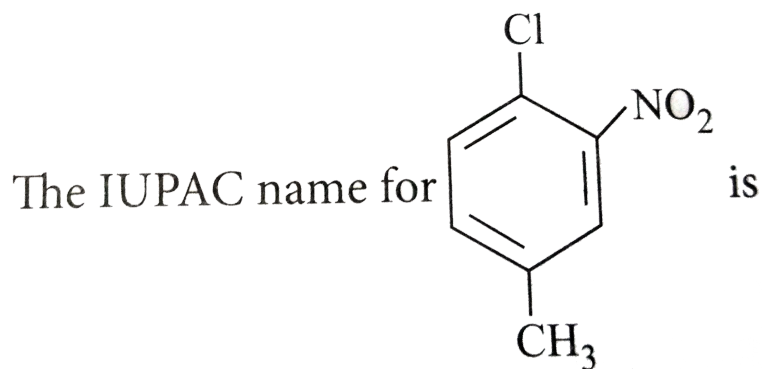
C. 1,carboxybutan-3-one

D. 4-oxopentanoic acid

Answer: D

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3. The IUPAC name for



A. 1-chloro-2-nitro-4-methylbenzene

B. 1-chloro-4-methyl-2-nitrobenzene

C. 2-chloro-1-nitro-5-methylbenzene

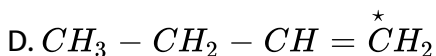
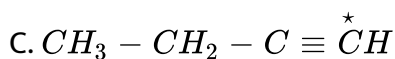
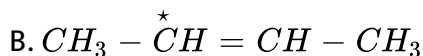
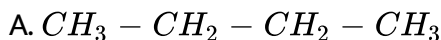
D. m-nitro-p-chlorotoluene

**Answer: B**



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4. Electronegativity of carbon atoms depends upon their state of hybridisation. In which of the following compounds, the carbon marked with asterisk is most electronegative?



**Answer: C**

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5. In which of the following functional group isomerism is not possible?

- A. Alcohols
- B. Aldehydes
- C. Alkyl halides
- D. Cyanides

**Answer: C**

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6. The fragrance of flowers is due to the presence of some steam volatile organic compounds called essential oils. These are generally insoluble in water at room temperature but are miscible with water

vapour in vapour phase. A suitable method for the extraction of these oils from the flowers is

- A. distillation
- B. crystallisation
- C. distillation under reduced pressure
- D. steam distillation

**Answer: D**



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7. During hearing of a court case, the judge suspected that some changes in the documents had been carried out. He asked the forensic department to check the ink used at two different places. According to you which technique can give the best results?

- A. Column chromatography
- B. solvent extraction



C. Distillation

D. Thin layer chromatography

**Answer: D**

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8. The principle involved in paper chromatography is

A. adsorption

B. partition

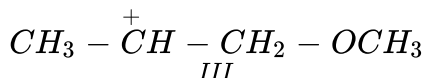
C. solubility

D. volatility

**Answer: B**

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9. What is the correct order of decreasing stability of the following cations?



A. I>II>III

B. I>III>II

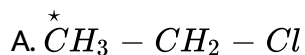
C. III>II>I

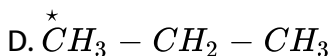
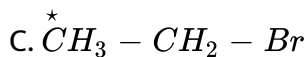
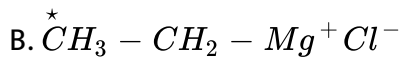
D. I>III>II

**Answer: A**

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10. In which of the following compounds the carbon marked with asterisk is expected to have greatest positive charge?

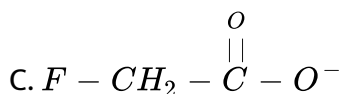
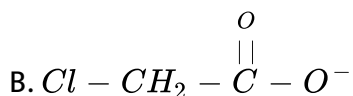
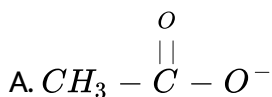




Answer: A

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11. Ionic species are stabilised by the dispersal of charge. Which of the following carboxylate ion is the most stable?



D. [d10lpgp6xz60nq.cloudfront.net/physics\\_images/NCERT\\_OBJ\\_FING\\_CHE\\_X](https://d10lpgp6xz60nq.cloudfront.net/physics_images/NCERT_OBJ_FING_CHE_X)

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**Answer: D**

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12. Electrophilic addition reactions proceed in two steps. The first step involves the addition of an electrophile. Name the type of intermediate formed in the first step of the following addition reaction.



- A. 2° carbanion
- B. 1° carbocation
- C. 2° carbocation
- D. 1° carbanion

**Answer: C**

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1. Assertion: Hybridisation influences the bond length and bond enthalpy in organic compound.

Reason: More the s character of hybrid orbital, shorter and stronger will be the bond.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**



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2. Assertion:  $sp^3$  hybrid carbon atom is more electronegative than  $sp$  hybrid carbon atom.

Reason:  $sp^3$  hybrid orbitals are more closer to the nucleus.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: D**



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3. Assertion: Rotation about  $C=C$  is restricted.

Reason: Electron charge cloud of the  $\pi$  bond is located above and below

the plane of bonding atoms.

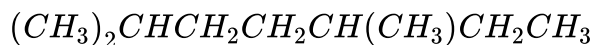
- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: B**



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**4. Assertion:** The name of the hydrocarbon



is 2,5-dimethylheptane and not 3,6-dimethylheptane.

Reason: Numbering should be done in such a way that sum of the locants on the parent chain is lowest possible number.

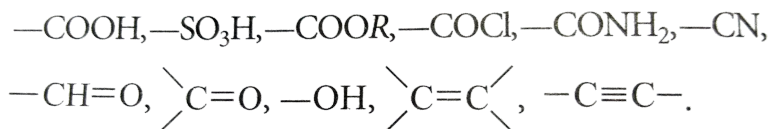
- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**

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5. Assertion: In the case of polyfunctional compounds, the choice of principal functional group is made on the basis of order of preference.

Reason: The order of decreasing priority for some functional group is





- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: B**

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6. Assertion: Alkanes containing more than three carbon atoms exhibit chain isomerism.

Reason: In an alkane, all carbon atoms are  $sp^3$  hybridised.

- A. If both assertion and reason are true and reason is the correct explanation of assertion

- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: B**

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7. Assertion: Nitroalkanes and alkyl nitrites exhibit functional isomerism.

Reason: Compounds having same molecular formula but different functional groups are called functional isomers.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer: A**

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**8.** Assertion: Heterolytic fission occurs readily in polar covalent bonds.

Reason: Heterolytic fission involves breaking of bond in such a way that the shared pair of electrons go with one atom.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: B**



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9. Assertion: When inductive and electromeric effects operate in opposite directions, the inductive effect predominates.

Reason: Inductive effect is the complete transfer of shared pair of  $\pi$  electrons to one of the atoms.

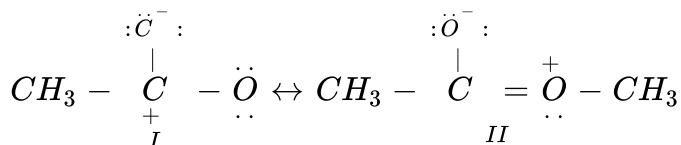
- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: D**



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10. Assertionj: The following structures (I) and (II) cannot be the major contributors to the real structure of  $CH_3COOCH_3$



Reason: Both the structures involve charge separation and structure (I) contains a carbon atom with an incomplete octet.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**



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11. Assertion: The order of stability of carbocations is  $3^\circ > 2^\circ > 1^\circ$

Reason: Carbon atom in carbocation is in  $sp^3$  state of hybridisation.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer: C**

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12. Assertion: Glycerol is purified by distillation under reduced pressure.

Reason: Method of distillation under reduced pressure is used to purify

liquids having very high boiling points and those, which decompose at or below their boiling points.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**



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**13.** Assertion: Paper chromatography is a type of partition chromatography.

Reason: Moving phase is liquid and stationary phase is solid.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: C**



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## Tetravalence Of Carbon Shape Of Organic Compounds

1. How many  $\sigma$  and  $\pi$  bonds are present in  $HC \equiv C - CH = CH - CH_3$ ?

A.  $9\sigma, 4\pi$

B.  $10\sigma, 3\pi$



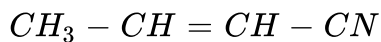
C.  $6\sigma, 6\pi$

D.  $5\sigma, 5\pi$

**Answer: B**

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2. Which type of hybridisation of each carbon is there in the compound?



A.  $sp^3, sp^2, sp^2, sp$

B.  $sp^3, sp^2, sp^2, sp^3$

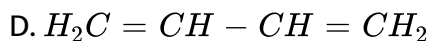
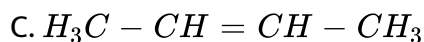
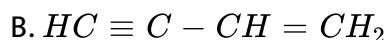
C.  $sp^3, sp^2, sp^3, sp^3$

D.  $sp^3, sp^2, sp, sp^3$

**Answer: A**

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3. Which of the following represents the given sequence of hybridisation of carbon atoms from left to right  $sp^2$ ,  $sp^2$ ,  $sp$ ,  $sp$ ?

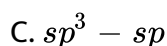
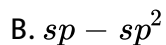
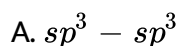


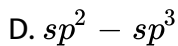
Answer: A



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4. The hybridisation of carbons of C-C single bond of  $HC \equiv C - CH = CH_2$  is





**Answer: B**

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5. What are the hybridization and shapes of the following molecules?



A. (i)  $sp^2$ , trigonal planar, (ii)  $sp^3$ , tetrahedral

B. (i)  $sp^3$ , tetrahedral, (ii) sp, linear

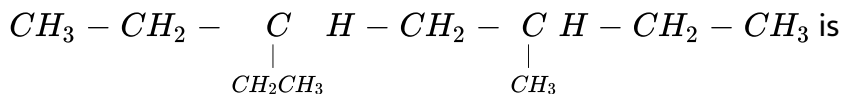
C. (i) sp, linear, (ii)  $sp^2$ , trigonal planar

D. (i)  $sp^2$ , trigonal planar, (ii)  $sp^2$ , trigonal planar

**Answer: B**

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1. Correct name for the given compound

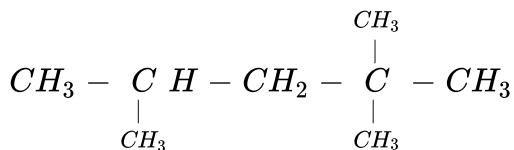


- A. 3-ethyl-5-methylheptane
- B. 5-ethyl-3-methylheptane
- C. 1,1-diethyl-3-methylpentane
- D. 3-methyl-5,5-diethylpentane

**Answer: A**

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2. How many primary, secondary, tertiary and quaternary carbon atoms are present in the following compound?

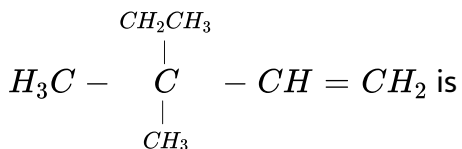


- A. One primary, two secondary and one tertiary
- B. Five primary, three secondary
- C. Five primary, one secondary, one tertiary and one quaternary
- D. four primary, two secondary and two quaternary

**Answer: C**

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3. The IUPAC name of the compound having formula



- A. 3,3,3-trimethylprop-1-ene
- B. 1,1,1-trimethylprop-2-ene
- C. 3,3-dimethylpent-1-ene
- D. 2,2-dimethylbut-3-ene.

Answer: C



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4. IUPAC name of  $(CH_3)_3C - CH = CH_2$  is

A. 2,2-dimethylbut-3-ene

B. 2,2-dimethylpent-4-ene

C. 3,3-dimethylbut-1-ene

D. hex-1-ene

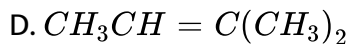
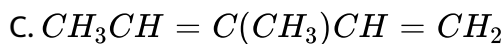
Answer: C



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5. Which of the following represents 3-methylpenta-1,3-diene?

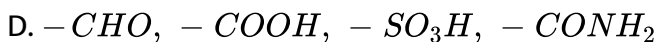
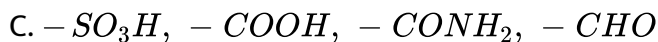
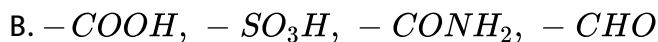
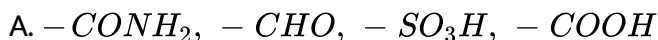
A.  $CH_2 = CH(CH_2)_2CH_3$



**Answer: C**

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6. The correct decreasing order of priority for the functional groups of organic compounds in the IUPAC system of nomenclature is



**Answer: B**

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7. Which of the following compounds is not correctly matched with its IUPAC name?

A.  $CH_3CH_2CH_2COOCH_2CH_3$ -Ethyl butanoate

B.  $CH_3 - \underset{\substack{| \\ CH_3}}{C} H - CH_2 - CHO - 3 -$  Methylbutanal

C.  $CH_3 - \underset{\substack{| \\ CH_3}}{C} H - \underset{\substack{|| \\ O}}{C} - CH_2CH_3 - 2 -$  methylpentan-3-one

D.  $CH_3 - \underset{\substack{| \\ OH}}{C} H - \underset{\substack{| \\ CH_3}}{C} H - CH_3 - 3 -$  Methylbutan-3-ol

Answer: D

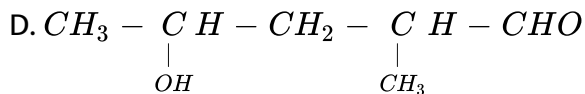
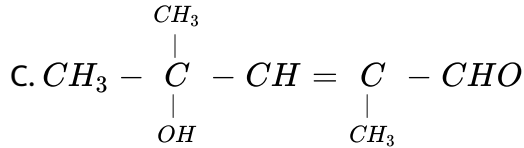
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8. The correct representation of 4-hydroxy-2-methylpent-2-en-1-al is

A.  $CH_3 - \underset{\substack{| \\ OH}}{C} H - CH = \underset{\substack{| \\ CH_3}}{C} - CHO$

B.  $CH_3 - \underset{\substack{| \\ CH_3}}{C} H - CH = \underset{\substack{| \\ OH}}{C} - CHO$





Answer: A

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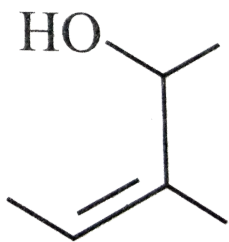
9. The correct name of  $CH_3CH_2 - \overset{\overset{O}{||}}{C} - \overset{\overset{CN}{|}}{C}H - CHO$  is

- A. 2-cyano-3-oxopentanal
- B. 2-formyl-3-oxopentanenitrile
- C. 2-cyano-1,3-pentadiene
- D. 1,3-dioxo-2-cyanopentane

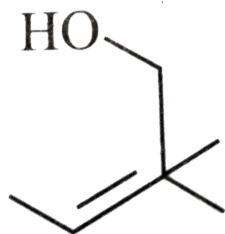
Answer: B

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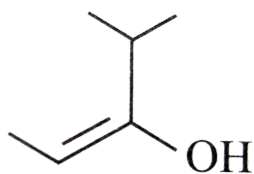
10. Correct representation of 3-methylpent-3-en-2-ol is



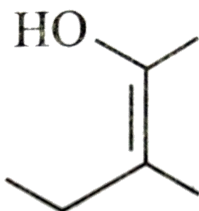
A.



B.



C.



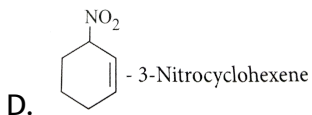
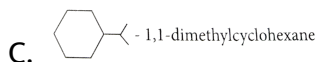
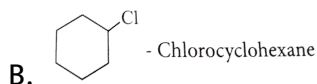
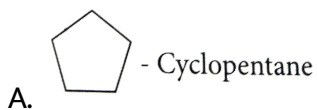
D.

Answer: A



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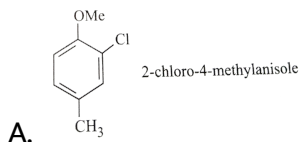
11. Which of the following IUPAC name is not correctly matched?

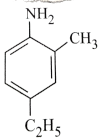


**Answer: C**

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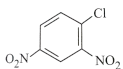
12. Which of the following names of substituted benzene compounds is not correct?





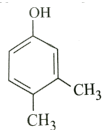
4-ethyl-2-methylaniline

B.



4-chloro-1,3-dinitrobenzene

C.



3,4-dimethylphenol

D.

**Answer: C**

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## Isomerism

1. What is the minimum number of carbon atoms of an alkane must have to form an isomer?

A. 4

B. 3

C. 2

D. 1

**Answer: A**



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2. 1-Butene and cyclobutane show

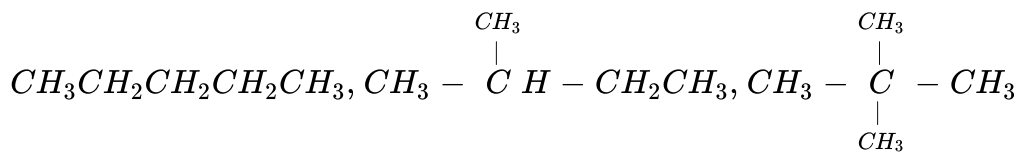
- A. position isomerism
- B. ring-chain isomerism
- C. functional isomerism
- D. metamerism

**Answer: B**



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3. The type of isomerism shown by the following compounds is



- A. position isomerism
- B. metamerism
- C. ring-chain isomerism
- D. chain isomerism

**Answer: D**

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4. Which of the followingg is an isomer of ethanol?

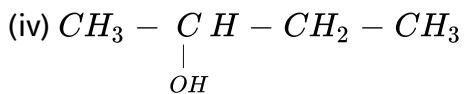
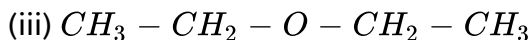
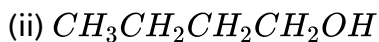
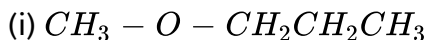
- A. Methanol
- B. Acetone
- C. Diethylether

## D. Dimethylether

Answer: D

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5. Given below are the structures of few compounds with molecular formula  $C_4H_{10}O$ . Select metamers from these structures.



A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (ii) and (iv)

**Answer: C**

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6. Which of the following compounds is isomeric with 2,2,4,4-tetramethylhexane?

- A. 3-ethyl-2,2-dimethylpentane
- B. 4-isopropylheptane
- C. 4-ethyl-3-methyl-4-n-propyloctane
- D. 4,4-diethyl-3-methylheptane

**Answer: B**

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1. Heterolysis of a carbon-chlorine bond produces

- A. two free radicals
- B. two carbocations
- C. one cation and one anion
- D. two carbanions.

**Answer: C**



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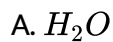
2. Which of the following intermediates contains three pairs of electrons in its valence shell?

- A. Carbocations
- B. Carbanions
- C. Free radicals
- D. Both (a) and (b)

**Answer: A**

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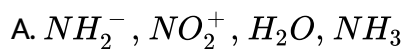
3. which of the following is an electrophilic reagent?



**Answer: D**

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4. Which of the following sets of groups contains only electrophiles?



B.  $F^-$ ,  $OH^-$ ,  $NH_3$ ,  $SO_3$

C.  $NO_2^+$ ,  $AlCl_3$ ,  $SO_3$ ,  $CH_3C^+ = O$

D.  $NH_3$ ,  $BF_3$ ,  $AlCl_3$ ,  $H_2O$

**Answer: C**

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5. Inductive effect involves

A. displacement of  $\sigma$ -electrons resulting in polarisation

B. displacement of  $\pi$ -electrons resulting in polarisation

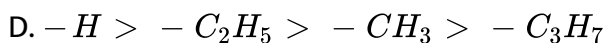
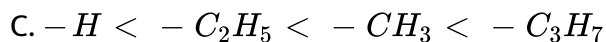
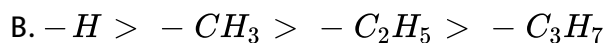
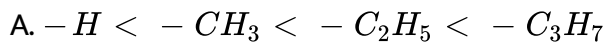
C. delocalisation of  $\sigma$ -electrons

D. delocalisation of  $\pi$ -electrons.

**Answer: A**

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6. The increasing order of electron donating inductive effect of alkyl groups is



**Answer: A**



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7. Inductive effect of which atom is taken as zero to compare inductive effect of other atoms?

A. Hydrogen

B. Chlorine

C. carbon

D. oxygen

**Answer: A**

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8. Maximum -I effect is exerted by the group

A.  $-C_6H_5$

B.  $-OCH_3$

C.  $-Cl$

D.  $-NO_2$

**Answer: D**

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9. Which one of the following acids would you expect to be the strongest?

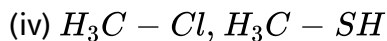
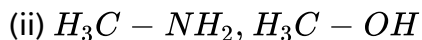
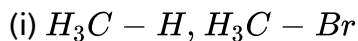


Answer: D



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10. Few pairs of molecules are given below. Which bond of the molecule of the pairs is more polar?



A.  $C - Br, C - N, C - O, C - Br$

B.  $C - Br, C - O, C - O, C - Cl$

C.  $C - Br, C - N, C - S, C - Cl$

D.  $C - Br, C - O, C - S, C - Br$

**Answer: B**

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11. Which of the following is the correct order of acidity of carboxylic acids?

(i)  $Cl_3CCOOH > Cl_2CHCOOH > ClCH_2COOH$

(ii)  $CH_3CH_2COOH > (CH_3)_2CHCOOH > (CH_3)_3CCOOH$

(iii)  $F_2CHCOOH > FCH_2COOH > ClCH_2COOH$

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. (i), (ii) and (iii)

**Answer: D**

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**12.** Point out the incorrect statement about resonance?

A. Resonance structures should have equal energy

B. In resonance structures, the constituent atoms must be in the same position

C. In resonance structures, there should not be same number of electron pairs

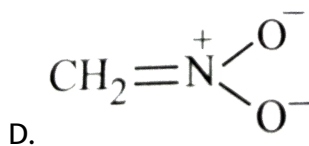
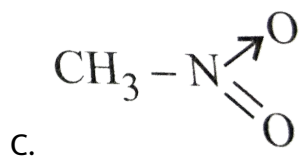
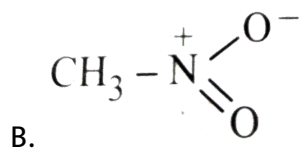
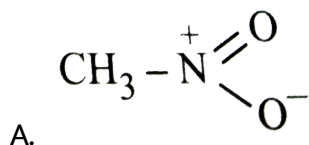
D. Resonance structures should differ only in the location of electrons around the constituent atoms.

**Answer: C**

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13. Which of the following is not structure of nitromethane molecule?



Answer: D

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14. Which of the following ions is the most resonance stabilised?

- A. Ethoxide
- B. Phenoxide
- C. Butoxide
- D. Isopropoxide

**Answer: B**

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**15. Hyperconjugation is**

- A.  $\sigma - \pi$  conjugation
- B. noticed due to delocalisation of  $\sigma$  and  $\pi$  bond
- C. no bond resonance
- D. all the above

**Answer: D**

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16. Stability of iso-butylene can be best explained by

- A. inductive effect
- B. mesomeric effect
- C. hyperconjugative effect
- D. steric effect

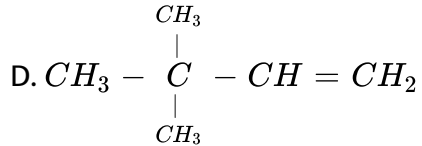
Answer: C



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17. Which of the following is true ?

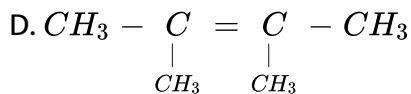
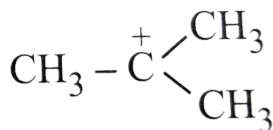
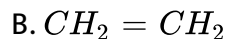
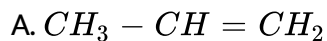
- A.  $CH_3 - \bar{C}H_2$
- B.  $C_6H_5 - CH_3$
- C.  $CH_2 = CH_2$



Answer: B

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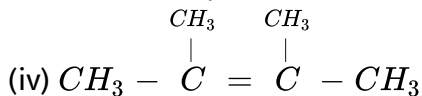
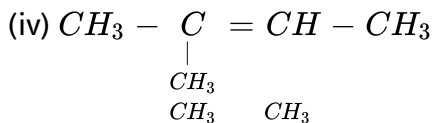
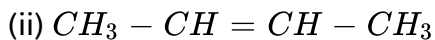
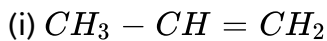
18. Hyperconjugation is not possible in



Answer: B

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19. Decreasing order of stability of following alkenes is



A. (i)>(ii)>(iii)>(iv)

B. (iv)>(iii)>(ii)>(i)

C. (iii)>(ii)>(i)>(iv)

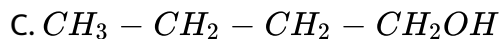
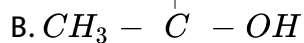
D. (ii)>(iii)>(iv)>(i)

**Answer: B**



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20. Which of the following alcohols on dehydration gives most stable carbocation?



**Answer: B**

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21. Stability of alkyl carbocations can be explained by

A. inductive effect only

B. hyperconjugation only

C. both inductive effect and hyperconjugation

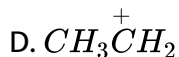
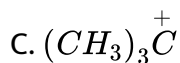
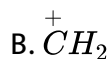
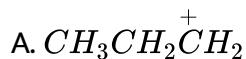
D. electromeric effect only

**Answer: C**



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22. The carbocation  $CH_3\overset{+}{C}HCH_3$  is less stable than



Answer: C



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23. Which of the following statements is not true about the stability of carbanions?

A. Stability of carbanions because with increase in s-character of orbital

B. The electron withdrawing groups like  $-\text{NO}_2$ ,  $-\text{CN}$ ,  $>\text{C}=\text{O}$

increases the stability of carbanions.

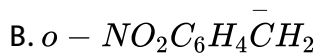
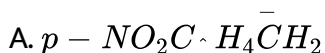
C. Order of stability of carbanions is  $3^\circ > 2^\circ > 1^\circ$ ,

D. The negatively charged carbon is  $sp^3$  hybridised and pyramidal.

Answer: C

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24. Which of the following carbanion expected to be most stable?

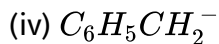
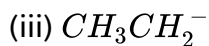
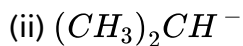
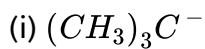


Answer: B

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25. The order of decreasing stability of the following carbanions is



A. (i)gt(ii)gt(iii)gt(iv)

B. (iv)gt(iii)gt(ii)gt(i)

C. (iv)gt(i)gt(ii)gt(iii)

D. (iii)gt(ii)gt(i)gt(Iv)

**Answer: B**



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26. Free radicals can undergo

A. rearrangement to a more stable free radical

B. decomposition to give another free radical

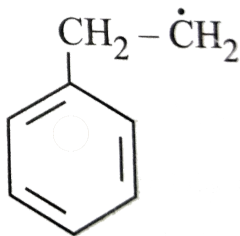
C. combination with other free radical

D. all are correct

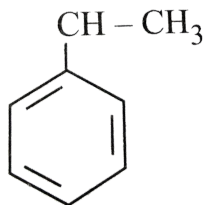
**Answer: D**

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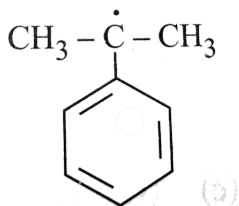
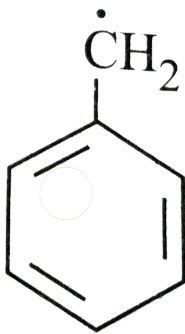
27. The most stable free radical among the following is



A.



B.



Answer: D

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28. Which of the following is a characteristic feature of a free radical?

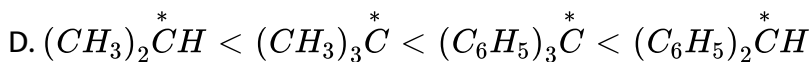
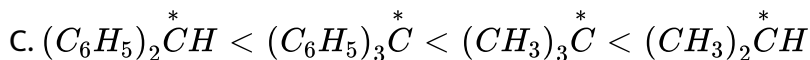
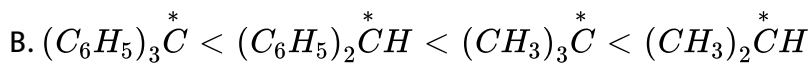
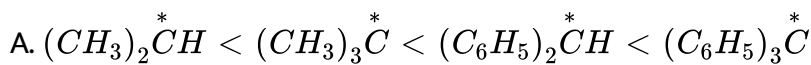
- A. It has a positive charge
- B. It has a negative charge
- C. It has all paired electrons.

D. It has an unpaired electron.

Answer: D

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29. The increasing order of stability of the following free radicals is



Answer: A

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30. Which of the following is a false statement?

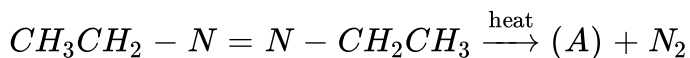
- A. Free radicals, carbonium ions or carbanions are reaction intermediates.
- B. Reaction between methane and chlorine in presence of sunlight proceeds via free radical
- C. The electronegative atom in the carbon chain produces +I effect
- D. Homolytic fission of C-C bonds gives free radicals

**Answer: C**



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**31.** Which type of intermediate (A) is formed during the reaction?



- A. Carbocation
- B. Carbanions
- C. Free radical

D. Carbene

**Answer: C**



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## Methods Of Purification Of Organic Compounds

1. Separation of two substances by crystallisation depends upon their differences in

A. densities

B. solubility

C. melting points

D. boiling points

**Answer: B**



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2. Those substances can be separated by steam distillation which are

- A. steam volatile and insoluble in water
- B. steam volatile and soluble in water
- C. steam volatile and sparingly soluble in water
- D. in liquid form in steam and solid form in water.

**Answer: A**



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3. Glycerine can be purified by

- A. vacuum distillation
- B. simple distillation
- C. steam distillation
- D. fractional distillation

**Answer: A**

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4. Distillation under reduced pressure is generally used to purify those liquids which

A. have very low boiling points

B. are volatile

C. have high boiling points and which decompose below their boiling points

D. have a large difference in their boiling points

**Answer: C**

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5. Which method can be applied to separate a mixture of camphor and benzoic acid?

- A. Sublimation
- B. Chemical methods
- C. Crystallisation
- D. Extraction with solvent

**Answer: B**



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6. The substance which can be used as adsorbent in column chromatography is

- A.  $Na_2O$
- B.  $Na_2SO_4$
- C.  $Al_2O_3$

D.  $\text{NaCl}$

**Answer: C**

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## Qualitative Analysis Of Organic Compounds

1. The presence of carbon in an organic compound can be shown by

- A. heating the compound with sodium
- B. heating the compound with cupric oxide
- C. heating the compound on bunsen flame
- D. heating the compound with magnesium

**Answer: B**

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2. In Lassaigne's test for N,S and halogens, the organic compound is

- A. fused with sodium
- B. dissolved with sodamide
- C. extracted with sodamide
- D. fused with calcium

**Answer: A**



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3. The blue compound formed in the positive test for nitrogen with Lassaigne solution of an organic compound is

- A.  $Na_4[Fe(CN)_5(NOS)]$
- B.  $Na_3[Fe(CN)_6]$
- C.  $Fe(CN)_3$
- D.  $Fe_4[Fe(CN)_6]_3$

**Answer: D**

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4. If on adding  $FeCl_3$  solution to acidified Lassaigne solution, a blood red colouration is produced, it indicates the presence of

A. S

B. N

C. N and S

D. S and Cl

**Answer: C**

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5. During sodium extract preparation for Lassaigne's test both N and S present in organic compound change to

A.  $\text{NaCN}$  and  $\text{Na}_2\text{S}$

B.  $\text{NaNH}_2$  and  $\text{Na}_2\text{SO}_4$

C.  $\text{NaSCN}$

D.  $\text{NaNO}_3$  and  $\text{Na}_2\text{S}$ .

**Answer: C**

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**6. Lassaigne's test for the detection of nitrogen fails in**

A.  $\text{NH}_2\text{CONHNH}_2 \cdot \text{HCl}$

B.  $\text{NH}_2\text{NH}_2 \cdot \text{HCl}$

C.  $\text{NH}_2\text{CONH}_2$

D.  $\text{C}_6\text{H}_5\text{NHNH}_2 \cdot \text{HCl}$

**Answer: B**

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7. Freshly prepared solution of sodium nitroprusside is added to the sodium extract. Appearance of a deep violet colour indicates the presence of

- A. nitrogen
- B. sulphur
- C. both nitrogen and sulphur
- D. halogen

**Answer: B**



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8. Which of the following will not give a white pt. when  $AgNO_3$  is added to its solution?

- A.  $CCl_4$

B.  $NaCl$

C.  $MgCl_2$

D.  $KCl$

**Answer: A**

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## Quantitative Analysis

1. 0.92 g of an organic compound was analysed by combustion method. The mass of the U-tube increased by 1.08 g. what is the percentage of hydrogen in the compound?

A. 0.1304

B. 0.5217

C. 0.6521

D. 0.113

**Answer: A**



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2. An organic compound gave 0.4655 g of  $CO_2$  on complete combustion. If the mass of the compound taken was 0.2115g, what is the percentage of C in it?

A. 0.133

B. 0.2667

C. 0.6003

D. 0.288

**Answer: C**



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3. In Duma's method 0.52g of an organic compound on combustion gave 68.6 mL  $N_2$  at  $27^\circ C$  and  $756\text{mm}$  pressure. What is the percentage of nitrogen in the compound?

A. 0.1222

B. 0.1493

C. 0.1584

D. 0.1623

**Answer: B**



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4. In Kjeldahl's method of estimation of nitrogen, nitrogen is quantitatively converted to ammonium sulphate. It is then treated with standard solution of alkali. The nitrogen which is present is estimated as

A.  $N_2$  gas

B.  $NO_2$  gas

C.  $NH_3$  gas

D.  $(NH_4)_2SO_4$  ppt

**Answer: C**

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5. In Carium method of estimation of halgoen, 0.15 g of an organic compound gave 0.12 g of AgBr. What is the percentage of bromine in the compound?

A. 0.6808

B. 0.3504

C. 42.1 %

D. 0.5

**Answer: B**



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6. 2.18g of an organic compound containing sulphur produces 1.02 g of  $BaSO_4$ . The percentage of sulphur in the compound is

A. 0.0726

B. 0.0898

C. 0.1

D. 0.0642

**Answer: D**



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7. 1.6 g of an organic compound gave 2.6 g of magnesium pyrophosphate. The percentage of phosphorus in the compound is

A. 0.4538

B. 0.5438

C. 0.3776

D. 0.1902

**Answer: A**



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8. The masses of carbon, hydrogen and oxygen in an organic compound are in the ratio 6:1:8 respectively. Which of the following pairs of formulae correspond to above information?

A.  $CH_3O$  and  $CH_3CHO$

B.  $CH_2O$  and  $C_3H_6O$

C.  $C_3H_6O$  and  $C_2H_6O_2$

D.  $C_3H_6O_3$  and  $HCHO$

**Answer: D**

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9. 0.2 g of an organic compound contains C, H and O. On combustion, it yields 0.15 g  $CO_2$  and 0.12 g  $H_2O$ . The percentage of C, H and O respectively is

A.  $C = 15\%$  ,  $H = 20\%$  ,  $O = 65\%$

B.  $C = 10\%$  ,  $H = 8.2\%$  ,  $O = 81.8\%$

C.  $C = 12.2\%$  ,  $H = 8.8\%$  ,  $O = 79\%$

D.  $C = 20\%$  ,  $H = 6.66\%$  ,  $O = 73.34\%$

**Answer: D**

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10. 0.92 g of an organic compound was analysed by combustion method. The mass of the U-tube increased by 1.08 g. what is the percentage of hydrogen in the compound?

A.  $C = 52.17\%$  ,  $H = 13.04\%$  ,  $O = 34.79\%$

B.  $C = 50\%$  ,  $H = 50\%$

C.  $C = 32.19\%$  ,  $H = 18.01\%$  ,  $O = 49.8\%$

D.  $C = 72\%$  ,  $H = 28\%$

**Answer: A**

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11. An organic compound contains 69% carbon and 4.8% hydrogen, the remainder being oxygen. What will be the masses of carbon dioxide and water produced when 0.20 g of this substance is subjected to complete combustion.

A. 0.40g

B. 0.50g

C. 0.60g

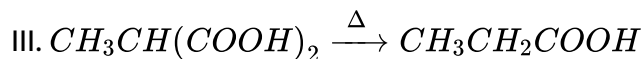
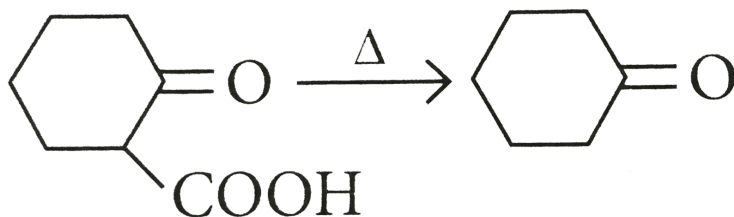
D. 0.70g

Answer: B

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## Higher Order Thinking Skills

1. Consider the following reactions.



In which cases, parent compound loses its functional group in preference?

A. I,II

B. I,II,III

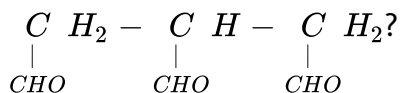
C. II,III

D. I,III

**Answer: A**

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2. Which of the following names is correct for



A. 3-Formylpentane-1,3-dial

B. 1,2,3-Triformylpropane

C. 2-Formylmethylbutane-1,4-dial

D. Propane-1,2,3-tricarbaldehyde.

**Answer: D**

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3. The number of structural and configurational isomers of a bromo compound,  $C_5H_9Br$ , formed by the addition of HBr to 2-pentyne respectively are

A. 1 and 2

B. 2 and 4

C. 4 and 2

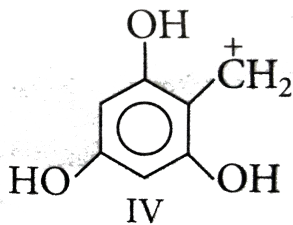
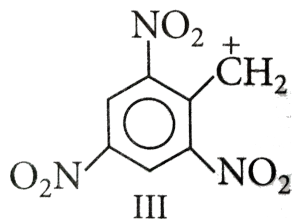
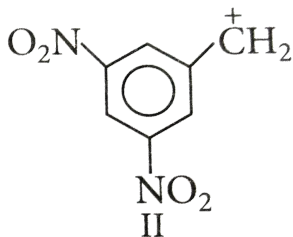
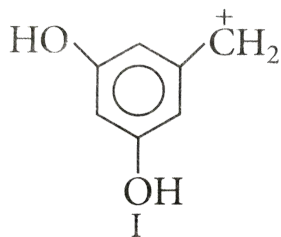
D. 2 and 1

**Answer: B**



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4. Arrange the following carbocations in decreasing order of stability



A.  $II > I > III > IV$

B.  $III > IV > I > II$

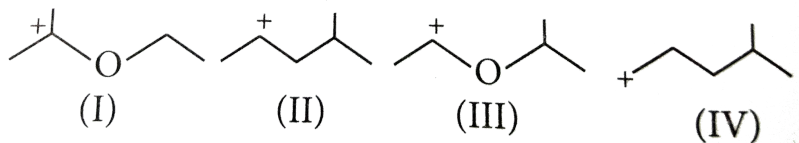
C.  $II > III > I > IV$

D.  $IV > I > II > III$

Answer: D

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5. The correct stability order for the following species is



A. II > IV > I > III

B. I > II > III > IV

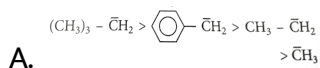
C. II > I > IV > III

D. I > III > II > IV

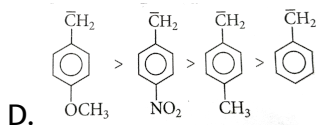
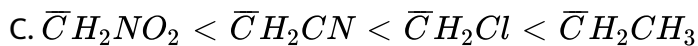
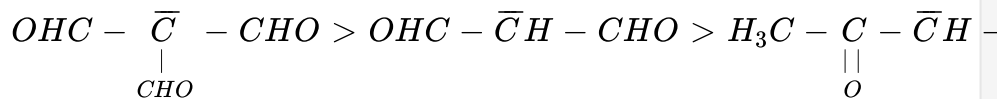
Answer: D

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6. Which of the following orders correctly depicts the decreasing order of stability of carbanion?



B.



**Answer: B**

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7. A sample of 0.50 g of an organic compound was treated according to Kjeldahl's method. The ammonia evolved was absorbed in 50 mL of 0.5 M  $H_2SO_4$ . The residual acid required 60 mL of 0.5 M solution of NaOH for neutralisation. What would be the percentage composition of nitrogen in the compound?

A. 50

B. 60

C. 56

D. 44

**Answer: C**



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## Ncert Exemplar

1. Which of the following is the correct IUPAC name?

A. 3-Ethyl-4,4-dimethylheptane

B. 4,4-Dimethyl-3-ethylheptane

C. 5-Ethyl-4,4-dimethylheptane

D. 4,4-Bis(methyl)-3-ethylheptane

**Answer: A**



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2. The IUPAC name for  $CH_3 - \overset{\overset{O}{\parallel}}{C} - CH_2 - CH_2 - \overset{\overset{O}{\parallel}}{C} - OH$  is \_\_\_\_\_.

A. 1-hydroxypentane-1,4-dione

B. 1,4-dioxopentanol

C. 1,carboxybutan-3-one

D. 4-oxopentanoic acid

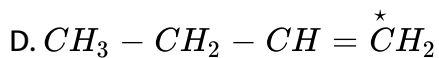
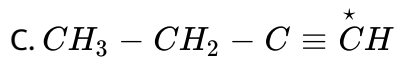
**Answer: D**

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3. Electronegativity of carbon atoms depends upon their state of hybridisation. In which of the following compounds, the carbon marked with asterisk is most electronegative?

A.  $CH_3 - CH_2 - CH_2 - CH_3$

B.  $CH_3 - \overset{*}{C}H = CH - CH_3$



**Answer: C**

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4. In which of the following functional group isomerism is not possible?

A. Alcohols

B. Aldehydes

C. Alkyl halides

D. Cyanides

**Answer: C**

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5. The fragrance of flowers is due to the presence of some steam volatile organic compounds called essential oils. These are generally insoluble in water at room temperature but are miscible with water vapour in vapour phase. A suitable method for the extraction of these oils from the flowers is

- A. distillation
- B. crystallisation
- C. distillation under reduced pressure
- D. steam distillation

**Answer: D**



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6. During hearing of a court case, the judge suspected that some changes in the documents had been carried out. He asked the forensic



department to check the ink used at two different places. According to you which technique can give the best results?

- A. Column chromatography
- B. solvent extraction
- C. Distillation
- D. Thin layer chromatography

**Answer: D**



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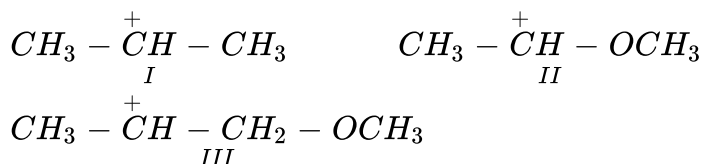
7. The principle involved in paper chromatography is

- A. adsorption
- B. partition
- C. solubility
- D. volatility

Answer: B

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8. What is the correct order of decreasing stability of the following cations?



A. IIgtIgtIII

B. IIgtIIIgtI

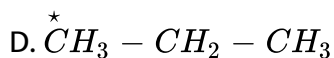
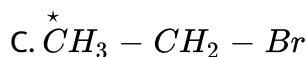
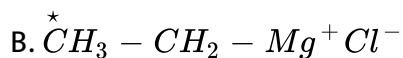
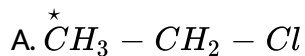
C. IIIgtIgtII

D. IgtIIgtIII

Answer: A

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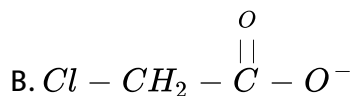
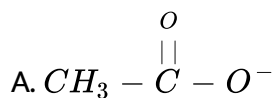
9. In which of the following compounds the carbon marked with asterisk is expected to have greatest positive charge?

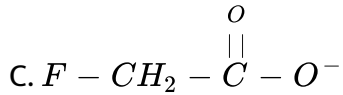


Answer: A

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10. Ionic species are stabilised by the dispersal of charge. Which of the following carboxylate ion is the most stable?





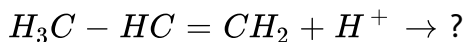
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**Answer: D**

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11. Electrophilic addition reactions proceed in two steps. The first step involves the addition of an electrophile. Name the type of intermediate formed in the first step of the following addition reaction.



- A.  $2^\circ$  carbanion
- B.  $1^\circ$  carbocation
- C.  $2^\circ$  carbocation
- D.  $1^\circ$  carbanion

**Answer: C**



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## Assertion And Reason

1. Assertion: Hybridisation influences the bond length and bond enthalpy in organic compound.

Reason: More the s character of hybrid orbital, shorter and stronger will be the bond.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**

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2. Assertion:  $sp^3$  hybrid carbon atom is more electronegative than  $sp$  hybrid carbon atom.

Reason:  $sp^3$  hybrid orbitals are more closer to the nucleus.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: D**

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3. Assertion: Rotation about C=C is restricted.

Reason: Electron charge cloud of the  $\pi$  bond is located above and below the plane of bonding atoms.

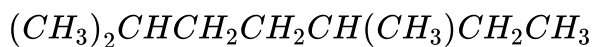
- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: B**



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4. Assertion: The name of the hydrocarbon



is 2,5-dimethylheptane and not 3,6-dimethylheptane.

Reason: Numbering should be done in such a way that sum of the locants on the parent chain is lowest possible number.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**



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5. Assertion: Alkanes containing more than three carbon atoms exhibit chain isomerism.

Reason: In an alkane, all carbon atoms are  $sp^3$  hybridised.



- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: B**



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- 6. Assertion:** Nitroalkanes and alkyl nitrites exhibit functional isomerism.
- Reason:** Compounds having same molecular formula but different functional groups are called functional isomers.
- A. If both assertion and reason are true and reason is the correct explanation of assertion

- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**

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7. Assertion: Heterolytic fission occurs readily in polar covalent bonds.

Reason: Heterolytic fission involves breaking of bond in such a way that the shared pair of electrons go with one atom.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer: B**

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**8.** Assertion: When inductive and electromeric effects operate in opposite directions, the inductive effect predominates.

Reason: Inductive effect is the complete transfer of shared pair of  $\pi$  electrons to one of the atoms.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

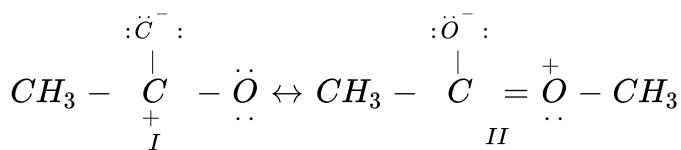
C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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9. Assertionj: The following structures (I) and (II) cannot be the major contributors to the real structure of  $CH_3COOCH_3$



Reason: Both the structures involve charge separation and structure (I) contains a carbon atom with an incomplete octet.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**

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**10.** Assertion: The order of stability of carbocations is  $3^\circ > 2^\circ > 1^\circ$

Reason: Carbon atom in carbocation is in  $sp^3$  state of hybridisation.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: C**

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**11.** Assertion: Glycerol is purified by distillation under reduced pressure.

Reason: Method of distillation under reduced pressure is used to purify liquids having very high boiling points and those, which decompose at or below their boiling points.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: A**



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**12.** Assertion: Paper chromatography is a type of partition chromatography.

Reason: Moving phase is liquid and stationary phase is solid.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not the correct explanation of assertion
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer: C**



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