

Bonding and hybridisation in organic compounds

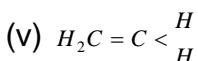
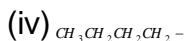
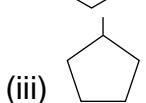
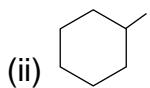
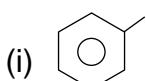
1. In methane molecule, the hydrogen atoms around carbon are arranged as
 - (a) Square planar (b) Tetrahedral
 - (c) Triangular (d) Octahedral
2. In carbon tetrachloride, four valence of carbon are directed to four corners of
 - (a) Rectangle
 - (b) Square
 - (c) Tetrahedron
 - (d) None of these
3. In alkene (ethene) number of sp^2 hybrid carbon atoms are
 - (a) 1 (b) 2
 - (c) 3 (d) 0
4. Each carbon atom in benzene is in the state of hybridization
 - (a) sp^3
 - (b) sp^2
 - (c) sp
 - (d) s^3p
5. Which of the following hybridisation has highest percentage of s-character
 - (a) sp^3
 - (b) sp^2
 - (c) sp
 - (d) None of these
6. The hybridisation present in C_2H_2 is
 - (a) sp
 - (b) sp^2
 - (c) sp^3
 - (d) dsp^2
7. What hybrid orbitals will form the following compound
 $H_3C - CH = CH - CH_2 - CH_3$
 - (a) sp and sp^3
 - (b) sp^2 and sp^3
 - (c) sp and sp^2
 - (d) Only sp^3
8. The compound in which carbon uses only its sp^3 hybrid orbitals for bond formation is
 - (a) $HCOOH$
 - (b) $(NH_2)_2CO$
 - (c) $(CH_3)_3COH$
 - (d) $(CH_3)_3CHO$
9. A straight chain hydrocarbon has the molecular formula C_8H_{10} . The hybridisation for the carbon atoms from one end of the chain to the other are respectively $sp^3, sp^2, sp^2, sp^3, sp^2, sp^2, sp$ and sp . The structural formula of the hydrocarbon would be
 - (a) $CH_3 - C \equiv C - CH_2 - CH = CH - CH = CH - CH_2$
 - (b) $CH_3 - CH_2 - CH = CH - CH_2 - C \equiv C - CH = CH - CH_2$
 - (c) $CH_3 - CH = CH - CH_2 - C \equiv C - CH = CH - CH_2$
 - (d) $CH_3 - CH = CH - CH_2 - CH = CH - C \equiv C - CH = CH$



- 10.** Which of the following has a bond formed by overlap of $sp - sp^3$ hybrid orbitals
- $CH_3 - C \equiv C - H$
 - $CH_3 - CH = CH - CH_3$
 - $CH_2 = CH - CH = CH_2$
 - $HC \equiv CH$
- 11.** The bond between carbon atom (1) and carbon atom (2) in compound $N \equiv C - CH = CH_2$ involves the hybridised carbon as
- sp^2 and sp^2
 - sp^3 and sp
 - sp and sp^2
 - sp and sp
- 12.** Number of π bonds in $CH_2 = CH - CH = CH - C \equiv CH$ is
- 2
 - 3
 - 4
 - 5
- 13.** Number of π electrons present in naphthalene is
- 4
 - 6
 - 10
 - 14
- 14.** Number of π electrons in cyclobutadienyl anion (C_4H_4) $^{-2}$ is
- 2
 - 4
 - 6
 - 8
- 15.** Homolytic fission of C - C bond in ethane gives an intermediate in which carbon is
- sp^3 hybridised
 - sp^2 hybridised
 - sp hybridised
 - sp^2d hybridized
- 16.** In the reaction
- $$Br > C = C < Br \xrightarrow[H_2]{\text{Catalyst}} BrCH_2 \underset{3}{CH} \underset{4}{CH}_2 Br$$
- The hybridisation states of carbon atoms 1, 2, 3, 4 are
- 1 and 2 sp^2 ; 3 and 4 sp^3
 - 1 and 2 sp^2 ; 3 and 4 sp
 - 1, 2, 3 and 4 sp
 - 1, 2 sp^3 ; 3, 4 sp^2
- 17.** In which of the compounds given below is there more than one kind of hybridisation (sp, sp^2, sp^3) for carbon
- $CH_3CH_2CH_2CH_3$
 - $CH_3 - CH = CH - CH_3$
 - $CH_2 = CH - CH = CH_2$
 - $H - C \equiv C - H$
- (i) and (iv)
 - (i) and (iv)
 - (ii) and (iii)
 - (ii)



- 18.** Examine the following common chemical structures to which simple functional groups are often attached



Which of these systems have essentially planar geometry

- (a) (i) and (v)
 - (b) (ii) and (iii)
 - (c) (ii), (iii) and (iv)
 - (d) (iv)
- 19.** The structure of di-chloromethane is
- (a) Tetrahedral
 - (b) Trigonal
 - (c) Linear
 - (d) Hexagonal
- 20.** The numbers of sigma (σ) bonds in 1-butene is
- (a) 8
 - (b) 10
 - (c) 11
 - (d) 12

