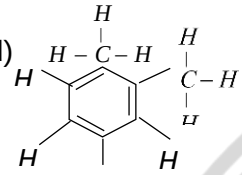
Bonding and hybridisation in organic compounds

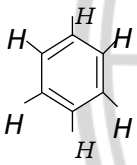
21. (d) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_3$

It has $3\ CH_3$ groups, one CH_2 group and one *CH* group.

22. (d) 

O–dimethyl benzene
or
O–xylene

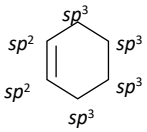
It has 18σ bonds and 3π bonds.

23. (d) 

$C - C = \sigma$ bonds = 6

$C - H = \sigma$ bonds = 6

12

24. (c) 

Cyclo hexene

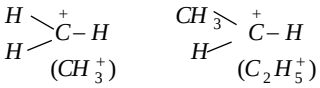
Two carbon atoms are sp^2-hybridized while remaining 4 are sp^3 hybridized.

25. (c) $\overset{1}{CH_2} = \overset{2}{CH} - \overset{3}{C} \equiv \overset{4}{C} - \overset{5}{CH_2} - \overset{6}{CH_3}$

3-hexyne-1-ene

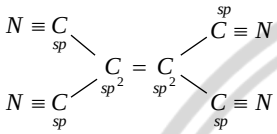
Three π bonds.

26. (a, c) Carbonium ions an sp^2 hybridized species.



27. (c) (a) $\underset{2\pi-\text{bonds}}{H-C\equiv C-H}$ (b) $\underset{2\pi-\text{bonds}}{CH_2=CH-\underset{\underset{H}{|}}{C}=O}$

(c) $\underset{1\pi\text{ bond}}{CH_3CH=CH_2}$ (d) $\underset{2\pi-\text{bonds}}{CH_3-CH=CH-\underset{\underset{O}{||}}{C}-OH}$

28. (c) 

29. (c) $\overset{\sigma}{H}-\overset{\sigma}{C}\underset{\pi}{\equiv}\overset{\sigma}{C}-\overset{\sigma}{H}$ 3σ and 2π bonds are present.

30. (d) Vinyl acetylene there are 6 unhybridised orbitals.

$\underset{\substack{1\\(\text{no. of unhybridised orbitals})}}{\overset{sp^2}{CH_2}}=\underset{1}{\overset{sp^2}{CH}}-\underset{2}{\overset{sp}{C}}\equiv\underset{2}{\overset{sp}{CH}}$

31. (c) Bond energy is maximum for triple bond.

32. (c) $\underset{5\sigma,\,1\pi}{CH_2=CH_2}$

33. (d) In benzene all 6 carbons are sp^2 hybridised.

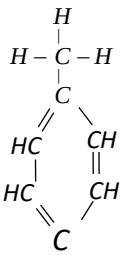
34. (c) $\underset{sp^2}{CH_2}=\underset{sp^2}{CH}-\underset{sp^2}{CH}=\underset{sp^2}{CH_2}$

35. (c) Tertiary (3^o) $C-H$ bond

36. (a) $\underset{7\sigma,3\pi}{CH_2 = CH - C \equiv CH}$

37. (c) Propyne has one acidic hydrogen.

38. (c) One σ bond and two π bonds

39. (d) 

15σ and 3π.

40. (b) In CCl_4 all bond angles are same *i.e.* of $109^o 28'$ the carbon is sp^3 hybridised.