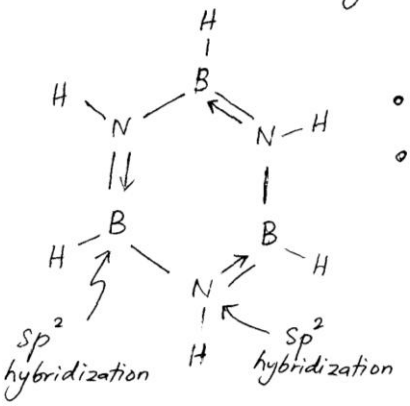
Sem I (2004/2005) : Theories of Chemical Bonding

Q_6 (a) $H_3B_3N_3H_3$

B and N atom - follow octet rule.



- molecule shape - hexagonal planar
- hybridization - sp^2 for B and N

∴ bond angle $B\hat{N}B$ and $N\hat{B}N = 120°$

Q_6 (b) (i) I_3^+

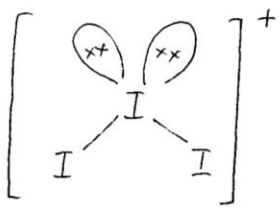
$I = 7e^-$

$2I = 2 \times 1e = 2e^-$

+ve charge = -1

total = $8e^-$ valens

∴ 4 pairs of e^- < 2 σ bond, 0 π bond, 2 lone pairs



MX_2E_2 : tetrahedral (structure)

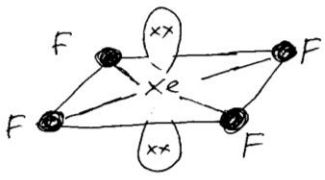
Molecule shape : V-shape @ bent

Since I_3^+ has two lone pairs - the molecule is polar.

Q_6 (b) (ii) XeF_4

Xe	$8e^-$
4F	$4(1e^-) = 4e^-$
Total	$12e^-$

∴ 6 pairs of e^- < 4 σ bond, 0 π bond, 2 lone pairs



Since the molecule is symmetry - it is a non-polar molecule.

MX_4E_2 : octahedral (structure)

molecule shape : square planar

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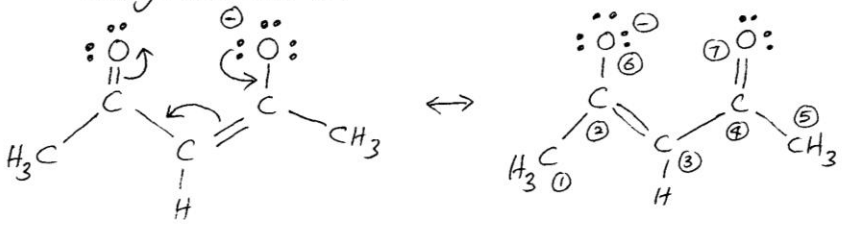
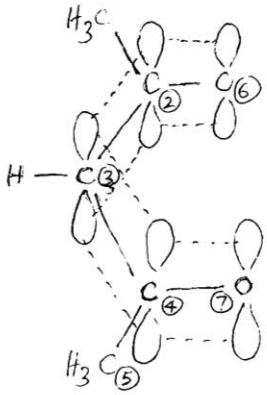
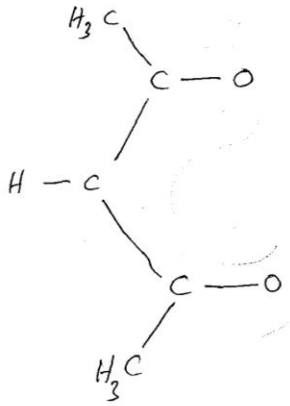
Q_6 (c): $[CH_3COCHCOCH_3]^-$

acetylacetonate ion – resonans structure



- sp^2 hibridization at carbon 2, 3 and 4
- π bond between (6) and (2) O = C
  (2) and (3) C = C
  (3) and (4) C = C
  (4) and (7) C = O





Molecular orbital for π bond between O – C – C – C – O

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