JEE MAIN-2007

CHEMISTRY

23. **Sol.** (C)

C_6H_{14}

$$H_3C-CH_2-CH_2-CH_2-CH_2-CH_3 \qquad H_3C-CH-CH_2-CH_2-CH_3$$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad | $$
$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad CH_3$$

$$H_3C-CH-CH-CH_2-CH_3 \qquad H_3C-CH-CH-CH_3 \qquad$$
$$\qquad\quad |\qquad\qquad\qquad\qquad\qquad\qquad\quad |\quad\ \ | $$
$$\qquad\quad CH_3 \qquad\qquad\qquad\qquad\qquad CH_3\ CH_3$$

$$H_3C-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-CH_3$$
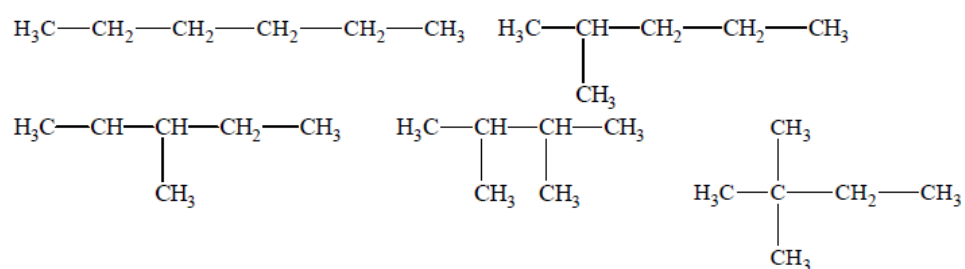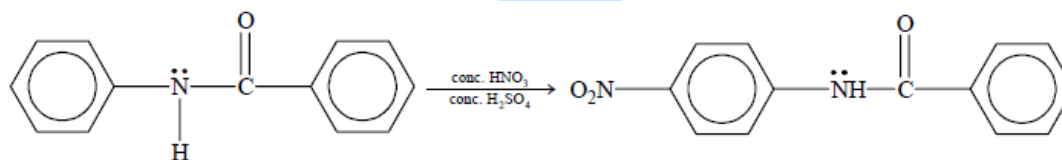
Hence (C) is correct.

24. **Sol.** (B)

Due to presence of lone pair of electron on nitrogen atom, it will activate the ring and it will stabilize intermediate cation at o and p positions.
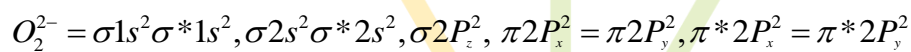
Hence (B) is correct.

25. **Sol.** (A)

$$\Delta T_f = K_f \times \text{molality} \times i$$

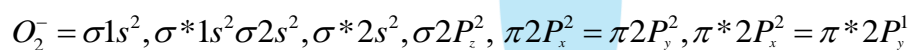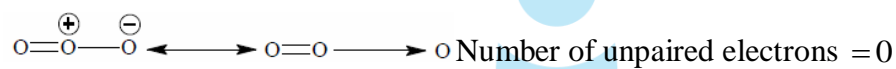$$2 = 1.72 \times \frac{20}{172} \times \frac{1000}{50} i$$

$$i = 0.5$$

Hence (A) is correct.
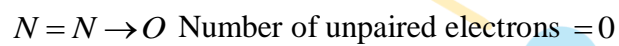
26. **Sol.** (D)

$$O_2^{2-} = \sigma 1s^2 \sigma *1s^2, \sigma 2s^2 \sigma *2s^2, \sigma 2P_z^2, \pi 2P_x^2 = \pi 2P_y^2, \pi *2P_x^2 = \pi *2P_y^2$$

Number of unpaired electrons $= 0$.

$N = N \rightarrow O$ Number of unpaired electrons $= 0$

$\overset{\oplus}{O}=\overset{}{O}-\overset{\ominus}{O} \longleftrightarrow O=O \longrightarrow O$ Number of unpaired electrons $= 0$

$$O_2^{-} = \sigma 1s^2, \sigma *1s^2 \sigma 2s^2, \sigma *2s^2, \sigma 2P_z^2, \pi 2P_x^2 = \pi 2P_y^2, \pi *2P_x^2 = \pi *2P_y^1$$

Number of unpaired electrons $= 1$

Thus O_2^{-} is paramagnetic.

Hence (D) is correct.

27. **Sol.** (B)

$$\Delta G^{\circ} = \Delta H^{\circ} - T\Delta S^{\circ}. - 54.07 \times 1000 - 298 \times 10 = -57050\, J\,\text{mol}^{-1}$$

$$-57050 = 5705\log_{10} K$$

$$\log_{10} K = 10$$

Hence (B) is correct

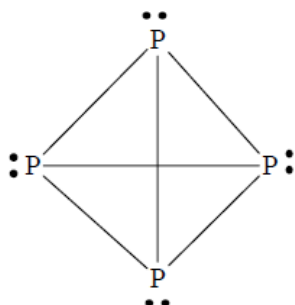28. **Sol.** (A)

$\text{NO}^{-}\,(16\,\text{electron system})$

Bond order $= 2$.

$\text{NO}^{\oplus}, \text{CN}^{-}$ and N_2 are isoelectronic with CO therefore all have same bond order $(=3)$

Hence (A) is correct.
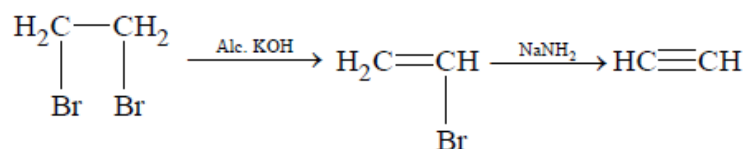
29. **Sol.** (D)

P is sp^3 hybridized in P_4.
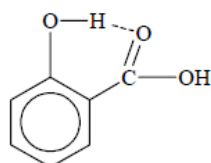

Hence (D) is correct.

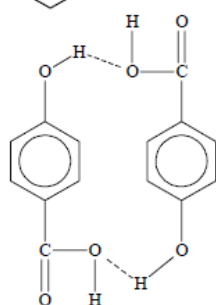30. **Sol.** (B)

   Option (B) is correct.

31. **Sol.** (B)

   Because $CH_2 = CH - Br$ has partial $C - Br$ double bond character, it requires more stronger base to remove HBr .

   Hence (B) is correct.

32. **Sol.** (D)

   More stabilized by intramolecular hydrogen bonding

   More stronger intermolecular forces increases the boiling point.

   Hence (D) is correct.

33. **Sol.** (B)

The formation of micelles takes places only above a particular temperature called Kraft temperature (T_k) and above a particular concentration called critical micelle concentration (CMC).
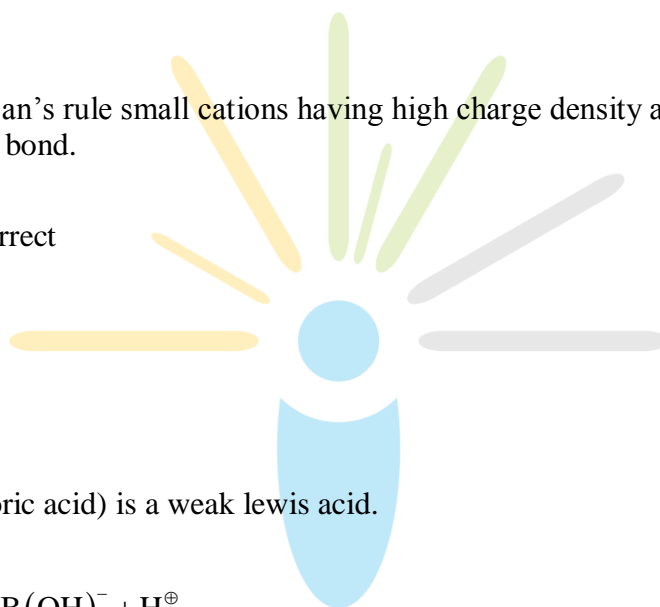
Each micelle contains at least 100 molecules. Therefore conductivity of the solution decreases sharply at the CMC.

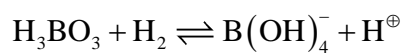Hence (B) is correct.

34. **Sol.** (A)

According to Fajan's rule small cations having high charge density always have tendency to form covalent bond.
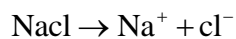
Hence (A) is correct

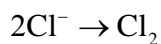35. **Sol.** (C)

H_3BO_3 (orthoboric acid) is a weak lewis acid.

$$H_3BO_3 + H_2 \rightleftharpoons B(OH)_4^- + H^\oplus$$

It does not donate proton rather it acceptors OH^- form water.

Hence (C) is correct

36. **Sol.** (B)

$Nacl \rightarrow Na^+ + cl^-$

At anode

$2Cl^- \rightarrow Cl_2$

Moles of $Cl = 2$ in $500\,ml$.

Therefore 1 mole of Cl_2 evolves.

Hence (B) is correct.

37. **Sol.** (D)

$Na - Hg$ $Na - Hg$ (amalgam) formed $= 2$ moles at cathode.

Hence (D) is correct.

38. **Sol.** (D)

2 moles of electrons $(2\,Faraday)$ are required.
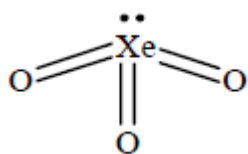
$1F = 96500$
$2F = 193000$

Hence (D) is correct.

39. **Sol. (A)**

Argon is used mainly to provide an inert atmosphere in high temperature metallurgical (arc welding of metals/alloys) extraction.
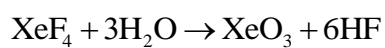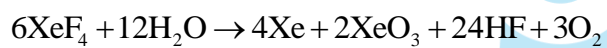
Hence (A) is correct.

40. **Sol.** (C)

sp^3 hybridized pyramidal structure.

Hence (C) is correct.

41. **Sol.** (A)

$6XeF_4 + 12H_2O \rightarrow 4Xe + 2XeO_3 + 24HF + 3O_2$

$XeF_4 + 3H_2O \rightarrow XeO_3 + 6HF$

Hence (A) is correct.