DIRECTORATE OF EDUCATION, GNCT OF DELHI

SUGGESTIVE ANSWERS: Term-II (2021-22)

CLASS-XI

SUBJECT: CHEMISTRY (043)

TIME: 2 Hrs. **MM: 35**

1. i) a) H-bonding b) London force or Dispersion force (1/2x2)

   ii) $V_{-273} = V_0 + \frac{-273x\ V_0}{273} = 0$ (1)

2. i) Definition (1)

   ii) –ve (1)

3. i) O_2^- ion have one unpaired e^- in π^x_{2p} orbital (1)

   ii) because of its high reactivity towards air and water. (1)

4. a) $n_{CH_4} = \frac{3.2}{16} = 0.2$ $n_{CO_2} = \frac{4.4}{44} = 0.1$ (1)

   Total moles = 0.2 + 0.1= 0.3 moles

   $P = \frac{n_T RT}{V} = \frac{0.3 \times 0.0831 \times 300}{9} = 0.831$ bar (1)

   b) z=1 (1)

   Or

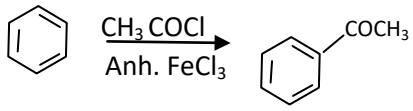
   a) PV =nRT (1)

   $P = \frac{n\ RT}{V} = \frac{mass \times RT}{V \times M} = \frac{d\ RT}{M}$

   $d = \frac{MP}{RT} \Rightarrow d \propto M$ (1)

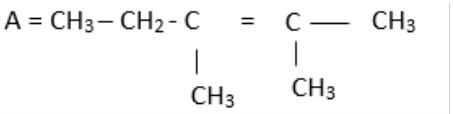
   (1/2 x 2=1)

   b) H, He

5. i) a) 

(1)

   b) $CH \equiv CH \xrightarrow{Na} CH \equiv C^-Na^+ \xrightarrow{CH_3CH_2Cl} CH \equiv C–CH_2–CH_3$ (1)

   ii  (1)

Or

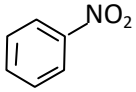
A= $CH_3 - CH_2 - \underset{\underset{Br}{|}}{CH} - CH_3$ (1x3=3)

B= $CH_3 - CH = CH - CH_3$

C= $CH_3 - CH_2 - CH = CH_2$

6. i) Due to inert pair effect
   ii)Al become passive with conc. HNO_3 due to formation of protective layer. (1x3=3)
   iii) Due to large size p- orbitals which do not cause effective overlapping.

7. i) Any two differences. (1x2=2)
   ii) due to non-availability of d- orbitals can't extend its covalency beyond four. (1)

8. i) $CH_3 - CH_2 - CH_2Br$ ii)  iii)  (1x3=3)

9. i) Any four anomalous properties
   ii) $Na + (x+y)NH_3 \longrightarrow Na^+(NH_3)_x + e^-(NH_3)_y$

Or

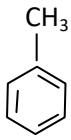
i) Due to small size of Be^{+2} its lattice energy with large size SO_4^{2-} in $BeSO_4$ is not very high and is soluble in water. Ba^{+2} being large sized , have high lattice energy large sized SO_4^{2-} in $BaSO_4$ and is insoluble in water. (2)

ii) Rb< K< Na< Li (1)

10. a) 3- Ethyl-2- methylpentane (1)

    b) $CH_3 - CH_2 - Cl + 2\,Na + Cl\text{-}CH_2 - CH_3 \xrightarrow{D.E.} CH_3 - CH_2 - CH_2\text{-}CH_3 + 2NaCl$ (1)

    or any another example

    c)  $+ CH_3Cl \xrightarrow{Anh.\ FeCl_3}$  $+HCl$ (1)

11. a) Target equation

$$6C_{(gr)} + 3H_{2(g)} \longrightarrow C_6H_{6(l)} \quad \Delta H = ?$$

On(i) x 6 + (ii) x 3 – (III)

We get 6 x (- 393.3) + 3 x (-286.6)- (- 3267.7) = 48.1 KJ

b- Definition

Or

a) For spontaneous process $\Delta G < 0$ (2)

⇨ $\Delta H - T\Delta S < 0$

⇨ $400 - T \times 0.2 < 0$

⇨ $400 < T \times 0.2$

⇨ $T > \frac{400}{0.2} = 2000k$

b) 1) $\Delta n_2 = 0$ 2) $\Delta U = 0$

12 i) H^+ produced by acid combines with CH_3COO^- in solution.

$H^+ + CH_3COO^- \rightleftharpoons CH_3COOH$

ii) Definition

$K_w = 1 \times 10^{-14}$ at 298 k

iii) By mixing equal moles of weak base and its salt with strong acid

iv) $NaOH \longrightarrow Na^+ + OH^-$

$[OH^-] = 10^{-3}\ M$

$(H^+) = \frac{10^{-14}}{10^{-3}} = 10^{-11}\ M$

$pH = - \log [H^+] = - \log 10^{-11} = 11$

0r

	CH_3COOH	$\rightleftharpoons$	CH_3COO^-	+	H^+
I.C	C		0		0
F.C	C (1-α)		Cα		Cα

$[H^+] = C\alpha = C\sqrt{\frac{Ka}{C}}$

$[H^+] = \sqrt{Ka.\ C}$

Putting the values we get

$[H^+] = 1 \times 10^{-3} M$

$pH = -\log [H^+]$

$= - \log 10^{-3}$

$pH = 3$