

## MOCK TEST PAPER # 4

### HINTS & SOLUTION

#### CHEMISTRY (CLASS-XII)

8. Nitrogen because of its small size and high electronegativity forms  $p\pi-p\pi$  multiple bonds. Phosphorus due to its larger size and lower electronegativity usually does not form  $p\pi-p\pi$  multiple bonds with itself.

$$9. W_B = \frac{\Delta T_f \times M_B \times W_A}{K_f \times 1000} = \frac{1.5 \times 176 \times 75}{3.9 \times 1000} = 5.08 \text{ g}$$

OR

Applying Henry's law

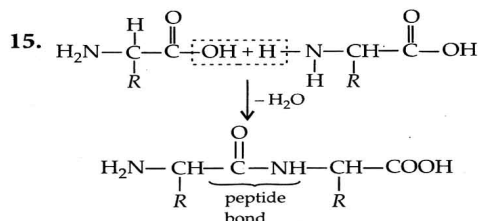
$$p = k_H x$$

$$\therefore x = \frac{p}{k_H} = \frac{760 \text{ mm}}{4.27 \times 10^5 \text{ mm}} = 1.78 \times 10^{-3}$$

10.  $2\text{Al} + \frac{3}{2}\text{O}_2 \longrightarrow \text{Al}_2\text{O}_3; \Delta G_f^\circ = -827 \text{ kJ/mol}$   
 $2\text{Cr} + \frac{3}{2}\text{O}_2 \longrightarrow \text{Cr}_2\text{O}_3; \Delta G_f^\circ = -540 \text{ kJ/mol}$   
 $\therefore \text{Cr}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Cr};$   
 $\Delta G = -827 - (-540) = -287 \text{ kJ/mol}$

11. **Fibrous proteins** : Polypeptides are parallel and insoluble in water e.g., Keratin, myosin  
**Globular proteins** : Polypeptide chains are coiled to give three dimensional structure e.g., Insulin and albumin.

12. **Antacids** : Which neutralise excess acid in gastric juices e.g., magnesium hydroxides, calcium carbonate.  
**Antihistamine** : They diminish the action of histamines hence prevent allergic reactions e.g., diphenhydramine.



$$17. z = \frac{d \times a^3 \times N_A}{M}$$

As the metal ( $z = 2$ ) has bcc structure

$$\therefore r = \frac{\sqrt{3}}{4} a = \frac{\sqrt{3}}{4} \times 5 = \frac{1.732 \times 5}{4} = 2.165 \text{ \AA}$$

$$18. E_a = \frac{2.303 RT_1 T_2}{(T_2 - T_1)} \log \left( \frac{k_2}{k_1} \right) = 61.292 \text{ kJ/mol}$$

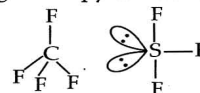
20.  $\text{XeF}_2$  is linear in shape with Xe in  $sp^3d$  hybridised state.  
 $\text{XeF}_4$  is square planar with Xe in  $sp^3d^2$

hybridised state.

$\text{XeF}_6$  has distorted octahedral structure.

OR

- (i)  $\text{I}_2 < \text{Br}_2 < \text{F}_2 < \text{Cl}_2$ .  
 (ii)  $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$   
 (iii)  $\text{BiH}_3 < \text{SbH}_3 < \text{AsH}_3 < \text{PH}_3 < \text{NH}_3$
21. (i)  $\text{SCl}_6$  does not exist due to large size of chlorine atom.  
 (ii)  $\text{CF}_4$  is tetrahedral in shape because carbon is  $sp^3$  hybridised while S in  $\text{SF}_4$  is  $sp^3d$  hybridised (as S has two lone pairs) and has a distorted trigonal bipyramidal shape.



(iii) Noble gases being monoatomic have no interatomic forces.

25. (i)  $\text{Zn}_{(s)} + \text{Cu}_{(aq)}^{2+} \longrightarrow \text{Zn}_{(aq)}^{2+} + \text{Cu}_{(s)}$   
 (b) The cell can be represented as  
 $\text{Zn}_{(s)} | \text{Zn}_{(aq)}^{2+} (0.02 \text{ M}) || \text{Cu}_{(aq)}^{2+} (0.01 \text{ M}) | \text{Cu}_{(s)}$   
 (c)  $E = E^\circ - \frac{0.059}{n} \log \frac{[\text{Zn}^{2+}]}{[\text{Cu}^{2+}]} = +1.091 \text{ V}$   
 (ii)  $\Delta_r G^\circ = -nFE^\circ = -212300 \text{ J}$

OR

- (i) Conductivity =  $\kappa = \frac{1}{\rho} = \left( \frac{1}{87.135} \right) \text{ S cm}^{-1}$   
 $= 0.01148 \text{ S cm}^{-1}$

Molar conductivity,

$$\Lambda_m = \frac{\kappa \times 1000}{c} = \frac{0.01148 \times 1000}{0.05} = 229.6 \text{ S cm}^2 \text{ mol}^{-1}$$

- (ii)  $\Lambda_m^\circ (\text{NH}_4\text{OH}) = 238.3 \Omega^{-1} \text{ cm}^2 \text{ mol}^{-1}$
26. (i)  $A \rightarrow \text{MnO}_2$   $B \rightarrow \text{K}_2\text{MnO}_4$   
 $C \rightarrow \text{MnO}_4^-$

The chemical equations involved are :

