

Initially	1	0	0
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After dissociation  $a - \alpha$        $\alpha$        $2\alpha$

$$\text{Total} = 1 - \alpha + \alpha + 2\alpha = 1 + 2\alpha$$

$$\alpha = \frac{1.98-1}{\alpha} = \frac{0.98}{\alpha} = 0.49$$

for a mole  $\alpha = 0.49$

$$\text{For } 0.01 \text{ mole } \alpha = \frac{0.49}{0.01} = 49$$

22. (c) It is an ionic salt.

23. (b) Due to common ion effect of  $H^+$ .

24. (d) Current does not affect the degree of ionization.

25. (c) Polar solvent facilitate ionisation of strong electrolytes due to dipole-ion attraction.

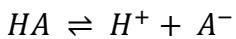
26. (d)  $HA \rightleftharpoons H^+ + A^-$

$$K = Ca^2 = 0.1 \times (10^{-4})^2 = 10^{-9}$$

27. (d)  $\sqrt{K_a \cdot c}$

For a weak acid, dissociation is very small.

So we use the approximation:



Dissociation is small  $\Rightarrow$

Let initial concentration =  $c$

Let  $x = [H^+]$  at equilibrium

Then:

$$K_a = \frac{(x \times x)}{(c - x)}$$

Since  $x$  is very small, we take  $c - x \approx c$

So:

$$K_a \approx \frac{x^2}{c}$$

Therefore:

$$x = \sqrt{K_a \times c}$$

And  $x = [H^+]$ , so:

$$[H^+] = \sqrt{K_a \cdot c}$$

28. (d) Degree of dissociation  $\alpha = ?$

$$\text{Normality of solution} = 0.1 N = \frac{1}{10} N$$

Volume = 10 litre

Dissociation constant  $K = 1 \times 10^{-5}$

$$K = \frac{\alpha^2}{V}; \alpha = \sqrt{KV} = \sqrt{1 \times 10^{-5} \times 10}; \alpha = 1 \times 10^{-2}$$

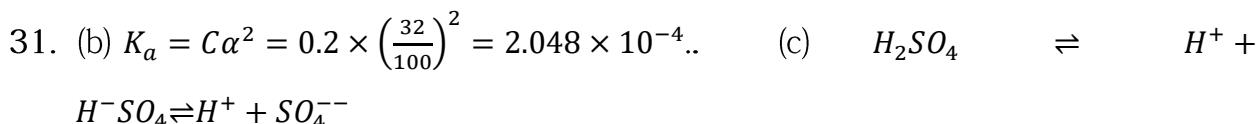
29. (d)  $MgCl_2 \rightleftharpoons Mg^{++} + 2Cl^-$  in aqueous solution it is dissociated into ions.

30. (c) Ostwald's dilution formula is  $\alpha^2 = K(1 - \alpha)/C$  but for weak electrolyte  $\alpha$  is

very small. So that  $(1 - \alpha)$  is neglected for weak electrolytes. So for weak

electrolyte the dilution formula is  $\alpha = \sqrt{\frac{K}{C}}$ .





Because of it is completely ionised.

33. (c) Colour of electrolyte depends on the nature of both ions.

e.g.  $CuSO_4$  is blue because  $Cu^{2+}$  ions are blue.

34. (c) Ionisation depends upon dilution, when dilution increases then ionisation is also increased.

35. (a) More is  $K_a$ , lesser is  $pK_a$  ( $pK_a = -\log K_a$ ) more is acidic strength.

36. For weak acid dissociation:



Let dissociation = x

So,

$$[H^+] = x$$

$$[CN^-] = x$$

Remaining HCN  $\approx 0.1$  M

Using the formula:

$$K_a = (x \times x) / 0.1$$

$$\Rightarrow x^2 = K_a \times 0.1$$

$$\Rightarrow x = \sqrt{(4 \times 10^{-10} \times 0.1)}$$

$$\Rightarrow x = \sqrt{(4 \times 10^{-11})}$$

$$\Rightarrow x = 2 \times 10^{-5.5}$$

$$10^{-5.5} \approx 3.162 \times 10^{-6}$$

So,

$$x = 2 \times 3.162 \times 10^{-6}$$

$$x = 6.324 \times 10^{-6} \text{ M}$$

$$\approx 6.3 \times 10^{-6} \text{ M}$$

Final Answer: (c)  $6.3 \times 10^{-6} \text{ M}$

