Date Planned : __ / __ / __	Daily Tutorial Sheet-2	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	JEE Main (Archive)	Exact Duration :_____

16. How many liters of water must be added to 1 L of an aqueous solution of HCl with a pH of 1 to create an aqueous solution with pH of 2? **(2006)**

(A) 0.1 L **(B)** 0.9 L **(C)** 2.0 L **(D)** 0.9 L

17. The pH of a 0.1 molar solution of the acid HQ is 3. The value of the ionization constant, K_a of the acid is: **(2006)**

(A) 3×10^{-1} **(B)** 1×10^{-3} **(C)** 1×10^{-5} **(D)** 1×10^{-7}

18. The first and second dissociation constant of an acid H_2A are 1.0×10^{-5} and 5.0×10^{-10} respectively. The overall dissociation constant of the acid will be: **(2007)**

(A) 5.0×10^{-5} **(B)** 5.0×10^{15} **(C)** 5.0×10^{-15} **(D)** 0.2×10^{5}

19. The K_{sp} for $Cr(OH)_3$ is 1.6×10^{-30}. The molar solubility of this compound in water is: **(2008)**

(A) $2\sqrt{1.6\times10^{-30}}$ **(B)** $4\sqrt{1.6\times10^{-30}}$

(C) $4\sqrt{1.6\times10^{-30}/27}$ **(D)** $1.6\times10^{-30}/27$

20. Four species are listed below : **(2008)**

(i) HCO_3^- **(ii)** H_3O^+ **(iii)** HSO_4^- **(iv)** HSO_3F

Which one of the following is the correct sequence of their acid strength?

(A) iv < ii < iii < i **(B)** ii < iii < i < iv **(C)** i < iii < ii < iv **(D)** iii < i < iv < ii

21. An acid HA ionizes as $HA \rightleftharpoons H^+ + A^-$. The pH of 1.0 M solution is 5. Its dissociation constant would be: **(2009)**

(A) 1×10^{-10} **(B)** 5 **(C)** 5×10^{-8} **(D)** 1×10^{-5}

22. Three reactions involving $H_2PO_4^-$ are given below: **(2010)**

I. $H_3PO_4 + H_2O \longrightarrow H_3O^+ + H_2PO_4^-$

II. $H_3PO_4^- + H_2O \longrightarrow HPO_4^{2-} + H_3O^+$

III. $H_2PO_4^- + OH^- \longrightarrow H_3PO_4 + O^{2+}$

In which of the above does $H_2PO_4^-$ act as an acid?

(A) II only **(B)** I and II **(C)** III only **(D)** I only

23. In aqueous solution, the ionization constants for carbonic acid are: **(2010)**

$K_1 = 4.2\times10^{-7}$ and $K_2 = 4.8\times10^{-11}$

Select the correct statement fort a saturated 0.034 M solution of the carbonic acid.

(A) The concentration of CO_3^{2-} is 0.034 M

(B) The concentration of CO_3^{2-} is greater than that of HCO_3^-

(C) The concentration of H^+ and HCO_3^- are approximately equal

(D) The concentration of H^+ is double that of CO_3^{2-}

24. Solubility product of silver bromide is 5.0×10^{-13}. The quantity of potassium bromide (molar mass taken as 120 g mol^{-1}) to be added to 1 L of 0.05 M solution of silver nitrate to start the precipitation of AgBr is: **(2011)**

(A) 1.2×10^{-10}g **(B)** 1.2×10^{-9}g **(C)** 6.2×10^{-5}g **(D)** 5.0×10^{-8}g

25. At 25°C, the solubility product of $Mg(OH)_2$ is 1.0×10^{-11}. At which pH, will Mg^{2+} ions start precipitating in the form of $Mg(OH)_2$ from a solution of 0.001 M Mg^{2+} ions? **(2012)**

(A) 9 **(B)** 10 **(C)** 11 **(D)** 8

26. How many litres of water must be added to 1L of an aqueous solution of HCl with a pH of 1 to create an aqueous solution with pH of 2? **(2013)**

(A) 0.1 L **(B)** 0.9 L **(C)** 2.0 L **(D)** 9.0 L

27. Solid $Ba(NO_3)_2$ is gradually dissolved in a 1.0×10^{-4} M Na_2CO_3 solution. At what concentrations of Ba^{2+}, will a precipitate begin to form ? (K_{sp} for $BaCO_3 = 5.1\times10^{-9}$) **2014)**

(A) 4.1×10^{-5} M **(B)** 5.1×10^{-5} M **(C)** 8.1×10^{-8} M **(D)** 8.1×10^{-7} M

28. pK_a of weak acid (HA) and pK_b of a weak base (BOH) are 3.2 and 3.4, respectively. The pH of their salt (AB) solution is: **(2017)**

(A) 1.0 **(B)** 7.2 **(C)** 6.9 **(D)** 7.0

29. Which of the following salts is the most basic in aqueous solution? **(2018)**

(A) $FeCl_3$ **(B)** $Pb(CH_3COO)_2$

(C) $Al(CN)_3$ **(D)** CH_3COOK

30. An alkali is titrated against an acid with methyl orange as indicator, which of the following is a correct combination? **(2018)**

	Base	**Acid**	**End point**
(A)	Weak	Strong	Yellow to pinkish red
(B)	Strong	Strong	Pink to colourless
(C)	Weak	Strong	Colourless to pink
(D)	Strong	Strong	Pinkish red to yellow