# CHEMISTRY

## JEE MAIN AND ADVANCED

## MOCK TEST 13

**Exercise**

**1.** Which among the following is a Lewis acid?

A. $NH_3$

B. $BF_3$

C. $H_2O$

D. $NH_4$

**Answer: B**

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**2.** The species which can act both as Bronsted acid and base is

A. $CO_3^{2-}$

B. $NO_3^-$

C. $HSO_4^-$

D. $SO_4^{2-}$

**Answer: C**

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**3.** An example of a strong electrolyte is

A. Glucose

B. Urea

C. Ammonium hydroxide

D. Sodium formate

**Answer: D**

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**4.** For a weak acid HA of concentration $C\left(moll^{-1}\right)$ and degree of dissociation $(\alpha)$, Ostwald's dilution law is represented by the equation

A. $K_a = \frac{C^2\alpha}{1-\alpha}$

B. $K_a = \frac{\alpha^2 C}{1-\alpha}$

C. $K_a = C\alpha$

D. $K_a = \frac{C\alpha^2}{1-\alpha^2}$

**Answer: B**

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**5.** In the given irreversible reaction, $H_2O + HCl \rightarrow H_3O^+ + Cl^-$ the species that acts as Bronsted base is

A. $H_2O$

B. $HCl$

C. $H_3O^+$

D. $Cl^-$

**Answer: A**

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**6.** pH of a 0.001 M NaOH solution will be

A. 9

B. 3

C. 11

D. 12

**Answer: C**

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**7.** pH of a solution is 5. Thus. the concentration of hydroxyl ion in the solution is

A. $9molL^{-1}$

B. $5molL^{-1}$

C. $10^{-5}molL^{-1}$

D. $10^{-9}molL^{-1}$

**Answer: D**

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**8.** The dissociation constant of an acid, HA is $1x10^{-5}$ The pH of 0.1 M solution of the acid will be

A. 3

B. 5

C. 4

D. 2

**Answer: A**

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**9.** 100 mL of 0.01 M solution of NaOH is diluted to 1 litre. The pH of resultant solution will be

A. 3

B. 12

C. 11

D. 8

**Answer: C**

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**10.** At 85°C, distilled water has $\left[H_3O^+\right]$ concentration equal to $1x10^{-6}$ molelitre. The value of $K_w$ at this temperature will be

A. $1 \cdot 10^{-8}$

B. $1 \cdot 10^{-14}$

C. $1 \cdot 10^{-12}$

D. $1 \cdot 10^{-7}$

**Answer: C**

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**11.** The pH of a solution obtained by mixing 50 mL of 2N HCI and 50 mL of 1 N NaOH is [log 5 = 0.7]

A. 1.7

B. 1.3

C. 0.7

D. 0.3

**Answer: D**

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**12.** If the pH of a solution is increased from 3 to 6, then $H^+$ ion concentration of the solution will be

A. Increased by 1000 times

B. Reduced to half

C. Reduced by 100 times

D. Reduced by 1000 times

**Answer: D**

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**13.** Ionic product of water increases, if

A. $H^+$ ions are added

B. OH ions are added

C. Temperature decreases

D. Temperature increases

**Answer: D**

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**14.** The hydrogen ion concentration of 0.1 M solution of acetic acid, which is 20% dissociated, is

A. 0.02 M

B. 2 M

C. 0.2 M

D. 0.002 M

**Answer: A**

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**15.** A monobasic weak acid solution which is 0.002 M has pH value equal to 5, The percentage ionization value of the acid in the solution will be

A. 0.5

B. 0.005

C. 5

D. 0.05

**Answer: A**

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**16.** The solubility of AgCl will be minimum in

A. $0.1MCaCl_2$

B. $0.01MAgNO_3$

C. Pure water

D. $0.1MNH_3$

**Answer: A**

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**17.** If the solubility of $Mg(OH)_2$ in water is $SmolL^{-1}$ then its $K_sp$ will be

A. $S^3$

B. $4S^3$

C. $27S^3$

D. $8S^3$

**Answer: B**

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**18.** Aqueous solution of sodium acetate is

A. Alkaline

B. Neutral

C. Weakly acidic

D. Strongly acidic

**Answer: A**

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**19.** An acidic buffer solution can be prepared by mixing the solutions of

A. Sodium chloride and sodium hydroxide

B. Nitric acid and sodium nitrate

C. Ammonium chloride and ammonium hydroxide

D. Sodium acetate and acetic acid

**Answer: D**

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**20.** In hydrolysis of a salt of weak acid and strong base, the hydrolysis constant $(K_a)$ is equal to

A. $\frac{K_w}{K_b}$

B. $\frac{K_w}{K_a \cdot K_b}$

C. $\frac{K_w}{K_a}$

D. $\frac{K_a \cdot K_b}{K_w}$

**Answer: C**

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**21.** The pH of a solution at $25^\circ C$ containing 0.20 M sodium acetate and 0.06 M acetic acid is $(pK_af \text{ or } CH_3COOH = 4.74 \text{ and } \log 3 = 0.477)$

A. 4.36

B. 5.26

C. 5.84

D. 6.32

**Answer: B**

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**22.** The pH of 0.2 M aqueous solution of $NH_4CI$ will be $(pK_aofNH_3 = 4.74, \log 2 = 0.3)$

A. 4.98

B. 5.42

C. 4.76

D. 4.32

**Answer: A**

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**23.** On adding ammonium chloride to a solution ammonium hydroxide

A. Dissociation of $NH_4OH$ increases

B. Concentration of OH increases

C. Concentration of OH decreases

D. Concentration of OH remains unchanged

**Answer: C**

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**24.** Aqueous solution of which salt will not be hydrolysed?

A. Potassium nitrate

B. Potassium cyanide

C. Potassium formate

D. Potassium acetate

**Answer: A**

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**25.** If $K_sp$ of $HgSO_4$, $is 6.4x10^{-5}M^2$, then solubility of the $HgSO_4$, in water will be

A. $5.4 \cdot 10^{-5}M$

B. $8 \cdot 10^{-3}M$

C. $8 \cdot 10^{-4}M$

D. $6.4 \cdot 10^{-3}M$

**Answer: B**

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**26.** pH of 0.5 M aqueous NaCN solution is

$(pK_a of HCN = 9.3, \log 5 = 0.7)$

A. 10.3

B. 9.5

C. 10.6

D. 11.5

**Answer: D**

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**27.** The pH of an aqueous solution of 1.0M ammonium formate will be

$(pk_a off \text{ or } micacid = 3.8 \text{ and } pK_a, ofammoniumhydr \otimes ide = 4.8)$

A. 5.5

B. 7.5

C. 6.1

D. 6.5

**Answer: D**

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**28.** How many grams of calcium oxalate should be dissolved in water to make one litre of saturated solution? $K_sp$ of $CaC_2O_4$ is $2.5x10^{-9}$ and its molecular weight is 128 u

A. $6.4 \cdot 10^{-3}g$

B. $8.0 \cdot 10^{-3}g$

C. $1.28 \cdot 10^{-3}g$

D. $6.4 \cdot 3.2^{-3}g$

**Answer: A**

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**29.** The pH at which M(OH), will begin to precipitate from a solution containing $0.10MM^2+$ ions $\left[K_spofM(OH)_2=1x10^{-9}M^3\right]$ 1 is

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**30.** If a certain buffer solution contains equal concentration of $X^-$ and HX. Then the pH of buffer will be $\left(K_bf \text{ or } X^{-i}s10^{-10}\right)$

A. 10

B. 4

C. 5

D. 11

**Answer: B**

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