

Questions

MathonGo

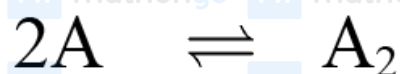
Q1 - 25 June - Shift 2

$$\Delta T = i k_f \times m$$

$$0.2 = i \times 1.86 \times \frac{0.7}{93} \times \frac{1000}{42}$$

$$i = \frac{0.2 \times 93 \times 6}{1.86 \times 100}$$

$$i = 0.60$$



$$1 - \alpha$$

$$\frac{\alpha}{2}$$

$$i = 1 - \alpha + \frac{\alpha}{2}$$

$$i = 1 - \frac{\alpha}{2}$$

$$1 - \frac{\alpha}{2} = 0.60$$

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$$\alpha = 0.80$$

Q2 - 25 June - Shift 2

Given below are two statements one is labelled as

Assertion A and the other is labelled as **Reason R:**

Assertion A : The amphoteric nature of water is explained by using Lewis acid/base concept.

Reason R : Water acts as an acid with NH_3 and as a base with H_2S .

In the light of the above statements choose the correct answer from the options given below :

- (A) Both A and R are true and R is the correct explanation of A.
- (B) Both A and R are true but R is NOT the correct explanation of A.
- (C) A is true but R is false.
- (D) A is false but R is true.

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Q3 - 26 June - Shift 1

50 mL of 0.1 M CH_3COOH is being titrated against 0.1 M NaOH . When 25 mL of NaOH has

been added, the pH of the solution will be

_____ $\times 10^{-2}$. (Nearest integer)

(Given : $\text{pK}_a(\text{CH}_3\text{COOH}) = 4.76$)

$\log 2 = 0.30$

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Q4 - 27 June - Shift 2

pH value of 0.001 M NaOH solution is _____.

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Q5 - 28 June - Shift 2

A student needs to prepare a buffer solution of propanoic acid and its sodium salt with pH 4. The

ratio of $\frac{[\text{CH}_3\text{CH}_2\text{COO}^-]}{[\text{CH}_3\text{CH}_2\text{COOH}]}$ required to make buffer

is

Given : $K_a(\text{CH}_3\text{CH}_2\text{COOH}) = 1.3 \times 10^{-5}$

- (A) 0.03 (B) 0.13
(C) 0.23 (D) 0.33

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Q6 - 29 June - Shift 1

The solubility of AgCl will be maximum in which of the following ?

- (A) 0.01 M KCl
(B) 0.01 M HCl
(C) 0.01 M AgNO₃
(D) Deionised water

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Answer Key

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Q1 (A)

Q2 (D)

Q3 (476)

Q4 (11)

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Q5 (B)

Q6 (D)

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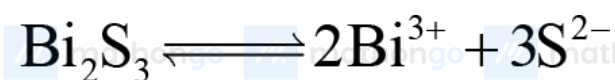
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Q1 (A)



$$K_{\text{sp}} = (2s)^2 (3s)^3$$

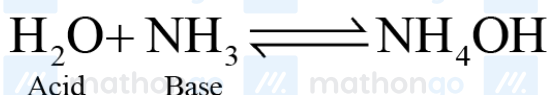
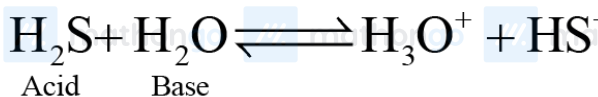
$$= 4s^2 \times 27 (s)^3$$

$$= 108 (s)^5$$

$$(s)^5 = \frac{1.08 \times 10^{-73}}{108}$$

$$\Rightarrow s = 10^{-15}$$

Q2 (D)



Q3 (476)

Hints and Solutions

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Moles of $\text{CH}_3\text{COOH} = 5$ m mole
moles of $\text{NaOH} = 2.5$ m mole



2.5 m mole 2.5 m mole
0 2.5 m mole 2.5 m mole

so buffer is formed

$$\text{pH} = \text{pKa} + \log \left(\frac{2.5/75}{2.5/75} \right) = \text{pKa}$$

$$\text{pH} = 4.76$$

$$= 4.76 \times 10^{-2}$$

Q4 (11)

0.001 M NaOH

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

$$\text{pOH} = 3$$

$$\text{pH} = 11$$

Q5 (B)

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Hints and Solutions

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$$\text{pH} = \text{pK}_a + \log \frac{[\text{Salt}]}{[\text{Acid}]}$$

$$4 = 5 - \log 1.3 + \log \frac{[\text{CH}_3\text{CH}_2\text{COO}^-]}{[\text{CH}_3\text{CH}_2\text{COOH}]}$$

$$\log \frac{[\text{CH}_3\text{CH}_2\text{COO}^-]}{[\text{CH}_3\text{CH}_2\text{COOH}]} = \log 1.3 - 1 = \log \frac{1.3}{10}$$

$$\frac{[\text{CH}_3\text{CH}_2\text{COO}^-]}{[\text{CH}_3\text{CH}_2\text{COOH}]} = 0.13$$

Q6 (D)

In deionized water no common ion effect will take place so maximum solubility

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