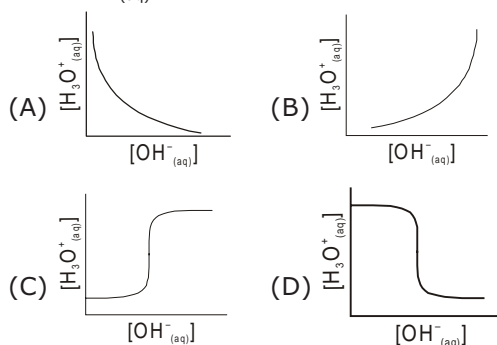
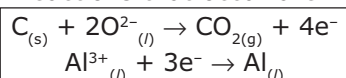


**Q.1** Of the graphs below, the one that best illustrates the relationship between  $[H_3O^+_{(aq)}]$  and  $[OH^-_{(aq)}]$  in a solution is-



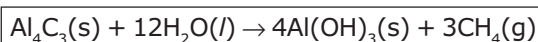
**Q.2** In the Hall-Heroult process, aluminum is produced by the electrolysis of molten  $Al_2O_3(l)$ . The half reactions that occur are :



The mass of  $Al_{(l)}$  produced for each 1.00 kg of  $C_{(s)}$  consumed is-

- (A) 1.69 kg (B) 2.45 kg  
(C) 3.00 kg (D) 6.00 kg

**Q.3** Methane gas can be prepared by reacting water with solid aluminum carbide, according to the following balanced reaction :



In the above reaction, 75.0 g of  $Al_4C_3$  (M.W. = 90.03 g/mol) reacted with 100.0 g of  $H_2O$  (M.W. = 18.02 g/mole), and a student obtains 20.0 g of  $CH_4$  (M.W. = 16.04 g/mole). The student's percent yield is :

- (A) 39.8% (B) 71.4%  
(C) 79.7% (D) 90.0%

**Q.4** A 100 gram sample of  $CaCO_3$  was heated until 3.33 L of  $CO_2$  was collected at 50.0°C and 742 torr. What percentage of the  $CaCO_3$  had decomposed?  $R = 0.08206 \text{ L atm/mol K}$ . 760 torr = 1 atm.

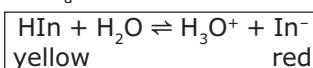
- (A) 6.84% (B) 9.10%  
(C) 12.3% (D) 15.8%

**Q.5** Carbon dioxide reacts with water to form carbonic acid ( $H_2CO_3$ ) and is called the acid anhydride of that acid. The anhydrides of sulfurous and nitric acids are :

- (A)  $SO_3$  and  $NO_2$  (B)  $SO_2$  and  $N_2O_5$   
(C)  $SO_3$  and  $N_2O_5$  (D)  $SO_2$  and  $NO_2$   
(E)  $SO_4^{2-}$  and  $NO_2$

**Q.6** A weak monoprotic acid (25.0 mL of a 0.10 M solution) is titrated to a phenolphthalein end-point with a 0.10 M solution of NaOH. Which statement about this titration is true?  
(A) The volume required will be less than 25.0 mL  
(B) The pH at the equivalence point will be less than 7.  
(C) The solution will be colourless after 27.0 mL of NaOH have been added.  
(D) The  $[H^+] = [OH^-]$  at the equivalence point  
(E) The pH at the equivalence point will be above 7.

**Q.7** An indicator that ionized as shown below for which its  $K_a = 1.0 \times 10^{-4}$



Select the answer that has all of the true statements.

- I. The predominant color in its acid range is yellow.  
II. In the middle of the pH range of its color change a solution containing the indicator will probably be orange.  
III. At pH = 7.00, a solution containing this indicator will be red.  
IV. At pH = 7.00, most of the indicator is unionized.  
V. The pH at which the indicator changes colour is pH = 4.

- (A) I, III, V (B) II, IV  
(C) III, IV, V (D) I, II, III, V

**Q.8** A sample contains  $3.01 \times 10^{20}$  molecules of  $SF_n$  and its mass is 54 mg. What is the value of n?

- (A) 1 (B) 2 (C) 4 (D) 6 (E) 8

**Q.9** The molar mass of a gas with a density of 5.8 g  $L^{-1}$  at 25°C and 740 mm Hg is closest to-

- (A) 190 g  $mol^{-1}$  (B) 150 g  $mol^{-1}$   
(C) 20 g  $mol^{-1}$  (D) 10 g  $mol^{-1}$   
(E) 5 g  $mol^{-1}$

**Q.10** If 1.50 g of  $H_2C_2O_4 \cdot 2H_2O$  were heated to drive off the water of hydration, how much anhydrous  $H_2C_2O_4$  would remain?

- (A) 0.34 g (B) 0.43 g  
(C) 0.92 g (D) 1.07 g (E) 1.50 g

**Q.11** What is the conjugate acid of  $HPO_4^{2-}$ ?

- (A)  $H_3PO_4(aq)$  (B)  $H_2PO_4^-(aq)$   
(C)  $H_3O^+(aq)$  (D)  $H^+(aq)$  (E)  $PO_4^{3-}(aq)$

**Q.12** If the percentage of water of crystallization in  $CuSO_4 \cdot xH_2O$  is 36.1%, what is the value of x?

- (A) 1 (B) 3 (C) 4 (D) 5 (E) 6

## CHEMISTRY IIT JEE (CLASS TEST - 8) (PHYSICAL) ANSWER KEY

Name : .....

Roll No. : .....

|   | A                     | B                     | C                     | D                     | E                     |   | A                     | B                     | C                     | D                     | E                     |    | A                     | B                     | C                     | D                     | E                     |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 5 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 9  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 6 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 10 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 7 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 11 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 8 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 12 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**ANSWER KEY (PHYSICAL TEST - 8)**

|             |          |          |          |          |          |          |          |          |          |           |           |           |
|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|
| <b>Que.</b> | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> | <b>12</b> |
| <b>Ans.</b> | A        | C        | D        | C        | B        | E        | D        | C        | B        | D         | B         | D         |