



## MIX TEST-3 (NEET)

### Some Basic Concepts of Chemistry + Thermodynamics-1 + Thermochemistry

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*"Don't judge yourself for falling short. Applaud yourself for trying."*

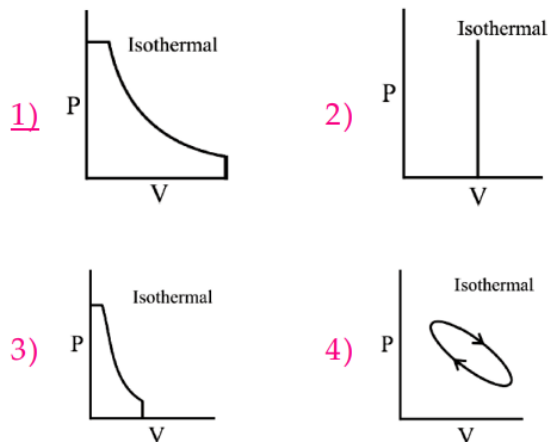
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- A binary mixture of bivalent metals having mass 2 g, molecular mass of A and B are 15 and 30 respectively, is dissolved in HCl, it evolves 2.24 L H<sub>2</sub> at STP. What is the mass of A present in mixture? (Atomic mass of A = 15 u, B = 30 u)**  
(1) 1 g                      (2) 1.5 g                      (3) 0.5 g                      (4) 0.75 g
- 0.078 g of hydrocarbon occupy 22.144 mL of volume at STP. The empirical formula of the hydrocarbon is CH. The molecular formula of the hydrocarbon is :**  
(1) C<sub>2</sub>H<sub>2</sub>                      (2) C<sub>6</sub>H<sub>6</sub>                      (3) C<sub>8</sub>H<sub>8</sub>                      (4) C<sub>4</sub>H<sub>4</sub>
- The mole percentage of oxygen in a mixture of 7.0 g of nitrogen and 8.0 g of oxygen is :**  
(1) 8                      (2) 16                      (3) 24                      (4) 50
- The mass of oxygen gas which occupies 5.6 litres at STP would be :**  
(1) The gram atomic mass of oxygen  
(2) One-fourth of the gram atomic mass of oxygen  
(3) Double the gram atomic mass of oxygen  
(4) Half of the gram atomic mass of oxygen
- The reaction of calcium with water is represented by the equation: Ca + 2H<sub>2</sub>O → Ca(OH)<sub>2</sub> + H<sub>2</sub> What volume of H<sub>2</sub> at STP would be liberated when 8 g of calcium completely reacts with water?**  
(1) 0.2 cm<sup>3</sup>                      (2) 0.4 cm<sup>3</sup>                      (3) 2240 cm<sup>3</sup>                      (4) 4480 cm<sup>3</sup>
- 12 g of Mg with excess of HCl at NTP gives :**  
(1) 11.2 dm<sup>3</sup> of H<sub>2</sub>                      (2) 22.4 dm<sup>3</sup> of H<sub>2</sub>                      (3) 5.6 dm<sup>3</sup> of H<sub>2</sub>                      (4) 15.6 dm<sup>3</sup> of H<sub>2</sub>
- Value of x in potash alum, K<sub>2</sub>SO<sub>4</sub>·Al<sub>x</sub>(SO<sub>4</sub>)<sub>3</sub>·24H<sub>2</sub>O is :**  
(1) 4                      (2) 1                      (3) 2                      (4) None of these

8. The molecular weight of an organic compound is 180. Its empirical formula is  $\text{CH}_2\text{O}$ . Its molecular formula is :

- (1)  $\text{C}_6\text{H}_{12}\text{O}_6$                       (2)  $\text{C}_7\text{H}_{16}\text{O}_5$                       (3)  $\text{C}_8\text{H}_4\text{O}_5$                       (4)  $\text{C}_5\text{H}_8\text{O}_7$

9. Which of the following p–V curve represents maximum work done?



- (1) 1                      (2) 2                      (3) 3                      (4) 4

10. At  $25^\circ\text{C}$  1 mole of butane upon heating forms  $\text{CO}_2$  and  $\text{H}_2\text{O}$ . The work done is :

- (1) 75.6 L atm                      (2) 85.6 L atm                      (3) 50.3 L atm                      (4) None of these

11. In which one of the following reactions does the heat change represent the heat of formation of water?

- (1)  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$  ;  $\Delta H = -116$  kcal  
 (2)  $\text{H}_2 + \frac{1}{2} \text{O}_2 \rightarrow \text{H}_2\text{O}$  ;  $\Delta H = -58$  kcal  
 (3)  $\text{H}^+ + \text{OH}^- \rightarrow \text{H}_2\text{O}$  ;  $\Delta H = -13.7$  kcal  
 (4)  $\text{C}_2\text{H}_2 + 2\frac{1}{2} \text{O}_2 \rightarrow 2\text{CO}_2 + \text{H}_2\text{O}$  ;  $\Delta H = -310$  kcal

12. In the complete combustion of butanol  $\text{C}_4\text{H}_9\text{OH}(l)$ , if  $\Delta H$  is enthalpy of combustion at constant pressure and  $\Delta E$  is the heat of combustion at constant volume, then —

- (1)  $\Delta E < \Delta H$   
 (1)  $\Delta E = \Delta H$   
 (1)  $\Delta E > \Delta H$   
 (1) Relation between  $\Delta E$  and  $\Delta H$  cannot be predicted

13. Which of the following is an endothermic reaction?

- (1)  $\text{N}_2(g) + 3\text{H}_2(g) - 92 \text{ kJ} \rightarrow 2\text{NH}_3(g)$                       (3)  $\text{H}_2(g) + \text{Cl}_2(g) \rightarrow 2\text{HCl}(g) + 184.6 \text{ kJ}$   
 (2)  $\text{N}_2(g) + \text{O}_2(g) + 180.8 \text{ kJ} \rightarrow 2\text{NO}(g)$                       (4)  $\text{C}(\text{graphite}) + 2\text{H}_2(g) \rightarrow \text{CH}_4(g) + 74.8 \text{ kJ}$

14. Given  $\Delta H^\circ_f$  for  $\text{CO}_2(g)$ ,  $\text{CO}(g)$  and  $\text{H}_2\text{O}(g)$  are  $-393.5$ ,  $-110.5$  and  $-241.8 \text{ kJ mol}^{-1}$  respectively. The  $\Delta H^\circ_r$  (in  $\text{kJ mol}^{-1}$ ) for the reaction  $\text{CO}_2(g) + \text{H}_2(g) \rightarrow \text{CO}(g) + \text{H}_2\text{O}(g)$  is :

- (1) 524.1                      (2)  $-262.5$                       (3)  $-41.7$                       (4) 41.2

15. The temperature of one mole of an ideal gas increases from 298 K when it absorbs 200 J of heat at constant volume. The change in internal energy of the gas is :
- (1) 200 J                      (2) 140 J                      (3) -200 J                      (4) -140 J
16. One mole of a non-ideal gas undergoes a change of state (2.0 atm, 3.0 L, 95 K) → (4.0 atm, 5.0 L, 245 K) with a change in internal energy  $\Delta U = 30.0 \text{ L atm}$ . The change in enthalpy  $\Delta H$  of the process in L atm is :
- (1) 40.0  
 (2) 42.3  
 (3) 44.0  
 (4) Not defined because pressure is not constant
17. **Assertion (A): U is a state function.**  
**Reason (R): T is an intensive property.**
- (1) Both A and R are correct and R is the correct explanation of A  
 (2) Both A and R are correct but R is not the correct explanation of A  
 (3) A is correct but R is incorrect  
 (4) Both A and R are incorrect
18. Which of the following are extensive properties?
- (1) V & E                      (2) V & T                      (3) V &  $C_p$                       (4) P & T
19. Choose the reaction in which  $\Delta H$  is not equal to  $\Delta U$  :
- (1)  $\text{C}(\text{graphite}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$                       (3)  $2\text{C}(\text{graphite}) + \text{H}_2(\text{g}) \rightarrow \text{C}_2\text{H}_2(\text{g})$   
 (2)  $\text{C}_2\text{H}_4(\text{g}) + \text{H}_2(\text{g}) \rightarrow \text{C}_2\text{H}_6(\text{g})$                       (4)  $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightarrow 2\text{HI}(\text{g})$
20. The correct thermochemical equation is :
- (1)  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$  ;  $\Delta H = -94 \text{ kCal}$                       (3)  $\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$  ;  $\Delta H = -94 \text{ kCal}$   
 (2)  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$  ;  $\Delta H = +94 \text{ kCal}$                       (4)  $\text{C}(\text{s}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g})$  ;  $\Delta H = +94 \text{ kCal}$
21. Which of the following equations represents standard heat of formation of  $\text{CH}_4$  :
- (1)  $\text{C}(\text{diamond}) + 2\text{H}_2(\text{g}) \rightarrow \text{CH}_4(\text{g})$                       (3)  $\text{C}(\text{diamond}) + 4\text{H}(\text{g}) \rightarrow \text{CH}_4(\text{g})$   
 (2)  $\text{C}(\text{graphite}) + 2\text{H}_2(\text{g}) \rightarrow \text{CH}_4(\text{g})$                       (4)  $\text{C}(\text{graphite}) + 4\text{H}(\text{g}) \rightarrow \text{CH}_4(\text{g})$
22. Reaction  $\text{H}_2(\text{s}) + \text{I}_2(\text{g}) \rightarrow 2\text{HI}$  ;  $\Delta H = 12.40 \text{ kCal}$ . According to this, heat of formation of HI will be :
- (1) 12.40 kCal                      (2) -12.40 kCal                      (3) -6.20 kCal                      (4) 6.20 kCal