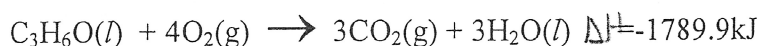


# Multiple Choices

- (1) 100 g of metal absorbs 1000 J as its temperature change (from 25 to 45 °C). The specific heat of the metal (in J/g °C) is:

(A) 10 (B) 0.5 (C) 5 (D) 50

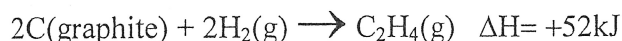
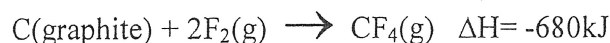
- (2) From the following information  $\Delta H_f^\circ$  (C<sub>3</sub>H<sub>6</sub>O(l)) is (in kJ/mol):



$$\Delta H_f^\circ (\text{CO}_2(g)) = -393.5 \text{ kJ/mol} \quad \text{and} \quad \Delta H_f^\circ (\text{H}_2\text{O}(l)) = -285.8 \text{ kJ/mol}$$

(A) +328 (B) -226 (C) +248 (D) -248

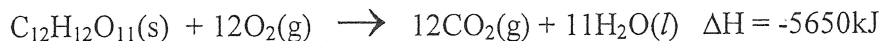
- (3) From the following information:



$\Delta H$  (in kJ) of this reaction  $\text{C}_2\text{H}_4(g) + 6\text{F}_2(g) \rightarrow 2\text{CF}_4(g) + 4\text{HF}(g)$  is:

(A) -2538 (B) -2486 (C) -2382 (D) -2330

- (4) From the following information:



The mass (in g) of C<sub>12</sub>H<sub>12</sub>O<sub>11</sub>(s) needed to obtain  $\Delta H = -170.18 \text{ kJ}$  is:

(A) 10 (B) 16 (C) 14 (D) 12

- (5) Given  $\Delta H_f^\circ$  (NH<sub>3</sub>(g)) = -46 kJ/mol. Calculate the change in internal energy,  $\Delta E^\circ$  (in kJ) of this reaction  $\text{N}_2(g) + 3\text{H}_2(g) \rightarrow 2\text{NH}_3(g)$

(A) -51 (B) -41 (C) -87 (D) -97

- (6) 500.0 g of water at 23 °C was cooled down and release 31380 J.

Knowing that the specific heat of water is 4.184 J/g °C, the new temperature of water in °C is:

(A) 10 (B) 5 (C) 6 (D) 8

- (7) The solubility of N<sub>2</sub> gas in water at 25 °C and N<sub>2</sub> partial pressure = 0.76 atm is  $5.2 \times 10^{-4} \text{ mol/l}$ . What is the partial pressure of nitrogen (in atm) at which its solubility in water is  $1.71 \times 10^{-3} \text{ mol/l}$  at 25 °C?

A) 2.7 B) 2.5 C) 2.3 D) 2.1

- 8) Benzene,  $C_6H_6$ , and toluene,  $C_7H_8$ , form ideal solution that has a total vapor pressure of 1.0 atm. What is the mole fraction of benzene in this solution?  
 $P^\circ_{(\text{Benzene})} = 1.326 \text{ atm}$  and  $P^\circ_{(\text{Toluene})} = 0.532 \text{ atm}$   
 (A) 0.59 (B) 0.56 (C) 0.62 (D) 0.64
- (9) The molar mass of a chemical that is non-volatile and non-electrolyte is  $6.8 \times 10^4 \text{ g/mole}$ . What is the osmotic pressure (in mmHg) at  $27^\circ\text{C}$  of 200 ml aqueous solution containing 8.0 g of this chemical?  
 (A) 9.0 (B) 11.0 (C) 13.0 (D) 14.0
- (10) 0.05 molal of  $\text{CaCl}_2$  aqueous solution freeze at  $-0.27^\circ\text{C}$ . What is the Vant's Hoff factor (i) of  $\text{CaCl}_2$ ?  
 $(K_f \text{ water} = 1.86^\circ\text{C/m})$   
 (A) 3.0 (B) 2.7 (C) 2.9 (D) 2.8
- (11) The unit of the rate constant for zero order reaction is:  
 (A)  $\text{mol l}^{-1}$  (B)  $\text{s}^{-1}$  (C)  $\text{l mol}^{-1} \text{s}^{-1}$  (D)  $\text{mol l}^{-1} \text{s}^{-1}$
- (12) A first order reaction has a rate constant of  $7.5 \times 10^{-3} \text{ s}^{-1}$ . The time (in seconds) needed for the reaction to be 60% complete is:  
 (A) 116.17 (B) 118.17 (C) 122.17 (D) 112.17
- (13) For this reaction:  $A + 3B \rightarrow 2D$ , The rate of D appearance is:  
 (A) Faster than A disappearance  
 (B) Faster than B disappearance  
 (C) Slower than A disappearance  
 (D) Equal to A disappearance
- (14) From this information:

Exp.	$[\text{NO}]_0 \text{ (M)}$	$[\text{H}_2]_0 \text{ (M)}$	Initial rate (M/s)
1	0.273	0.763	2.83
2	0.273	1.526	2.83
3	0.819	0.763	25.47

The rate law for this reaction  $2\text{NO} + \text{H}_2 \rightarrow \text{N}_2\text{O} + \text{H}_2\text{O}$  is:

- (A)  $\text{Rate} = k[\text{NO}]^2 [\text{H}_2]$  (B)  $\text{Rate} = k[\text{NO}] [\text{H}_2]^2$  (C)  $\text{Rate} = k[\text{NO}]^2 [\text{H}_2]^2$  (D)  $\text{Rate} = k[\text{NO}]^2$
- (15)  $A \rightarrow B$  is a first order reaction. Which of the following statements is true?  
 (A)  $t_{1/2}$  increases as  $[A]_0$  increases.  
 (B)  $t_{1/2}$  decreases as  $[A]_0$  increases.  
 (C)  $t_{1/2}$  decreases as (the rate constant) increases.  
 (D)  $t_{1/2}$  increases as (the rate constant) increases.

THE END