

## Topic :- THERMODYNAMICS

1.  $C_{\text{diamond}} + O_2(g) \rightarrow CO_2(g); \Delta H = -395 \text{ kJ}$  .....(i)  
 $C_{\text{graphite}} + O_2(g) \rightarrow CO_2(g); \Delta H = -393.5 \text{ kJ}$  .....(ii)  
The  $\Delta H$ , when diamond is formed from graphite, is :
- a)  $-1.5 \text{ kJ}$                       b)  $+1.5 \text{ kJ}$                       c)  $+3.0 \text{ kJ}$                       d)  $-3.0 \text{ kJ}$
2. Entropy change of fusion at constant pressure is given by:
- a)  $\Delta S_{(f)} = \frac{\Delta H_f}{T}$                       b)  $\Delta S_{(f)} = \frac{\Delta G_f}{T}$                       c)  $\Delta S_{(f)} = \frac{\Delta H_f}{\Delta T}$                       d) None of these
3. At  $27^\circ\text{C}$ , one mole of an ideal gas is compressed isothermally and reversibly from a pressure of 2 atm to 10 atm. The values of  $\Delta E$  and  $q$  are ( $R = 2$ )
- a) 0,  $-965.84 \text{ cal}$                       b)  $-965.84 \text{ cal}$ ,  $-865.58 \text{ cal}$   
c)  $+865.58 \text{ cal}$ ,  $-865.58 \text{ cal}$                       d)  $-865.58 \text{ cal}$ ,  $-865.58 \text{ cal}$
4. When hydrogen and oxygen burn to form water in an oxyhydrogen torch, the entropy change is:
- a) Negative  
b) Positive  
c) Zero  
d) May be positive or negative
5. The temperature coefficient of e.m.f. of a cell can be given by:
- a)  $\left(\frac{\partial E}{\partial T}\right)_P = \frac{\Delta S}{nF}$                       b)  $\left(\frac{\partial E}{\partial T}\right)_P = \left(\frac{E_2 - E_1}{T_2 - T_1}\right)_P$                       c)  $\left(\frac{\partial E}{\partial T}\right)_P = \left[\frac{\Delta H}{nF} + E\right]_T$                       d) All of these
6. The internal energy of one mole of a gas is:
- a)  $\frac{3}{2}RT$                       b)  $\frac{KT}{2}$                       c)  $\frac{RT}{2}$                       d)  $\frac{3KT}{2}$
7. The resultant heat change in a reaction is the same whether it takes place in one or several stages. This statement is called
- a) Lavoisier and Laplace law                      b) Hess's law  
c) Joule's law                      d) Le-Chatelier's principle
8.  $\Delta H$  for transition of carbon in the diamond form to carbon in the graphite form, is  $-453.5 \text{ cal}$ . This suggests that :
- a) Graphite is chemically different from diamond  
b) Graphite is as stable as diamond  
c) Graphite is more stable than diamond

- d) Diamond is more stable than graphite
9. The enthalpy of fusion of ice per mole is  
 a) 18 kJ                                      b) 8 kJ                                      c) 80 kJ                                      d) 6 kJ
10. For the reversible vaporisation of water at 100°C and 1 atmospheric pressure,  $\Delta G$  is equal to:  
 a)  $\Delta H$                                       b)  $\Delta S$                                       c) Zero                                      d)  $\Delta H/T$
11. Molar heat of vaporisation of a liquid is 6 kJmol<sup>-1</sup>. If the entropy change is 16 J mol<sup>-1</sup>K<sup>-1</sup>, the boiling point of the liquid is  
 a) 273 K                                      b) 375°C                                      c) 375 K                                      d) 102°C
12. The enthalpy of fusion of water is 1.435 kcal/mol. The molar entropy change for the melting of ice at 0°C is:  
 a) 5.260 cal/(mol K)                      b) 0.526 cal/(mol K)                      c) 10.52cal/(mol K)                      d) 21.04 cal/(mol K)
13. Which of the following is an endothermic reaction?  
 a)  $N_2(g) + 3H_2(g) - 92kJ \rightarrow 2NH_3(g)$                       b)  $N_2(g) + O_2(g) + 180.8 kJ \rightarrow 2NO(g)$   
 c)  $H_2(g) + Cl_2(g) \rightarrow 2HCl(g) + 184.6 kJ$                       d)  $C(\text{graphite}) + 2H_2(g) \rightarrow CH_4(g) + 74.8 kJ$
14. The  $\Delta G$  in the process of melting of ice at -15°C is:  
 a)  $\Delta G = -ve$                                       b)  $\Delta G = +ve$                                       c)  $\Delta G = 0$                                       d) All of these
15. A container has hydrogen and oxygen mixture in ratio of 1 : 1 by weight, then  
 a) Internal energy of the mixture decreases                      b) Internal energy of the mixture increases  
 c) Entropy of the mixture increases                      d) Entropy of the mixture decreases
16. Which one is not a spontaneous process?  
 a) Dissolution of CuSO<sub>4</sub> in water  
 b) Water flowing down the hills  
 c) Flow of current from low potential to high potential  
 d) None of the above
17. 1 mole of gas occupying 3 L volume is expanded against a constant external pressure of 1 atm to a volume of 15 litre. The work done by the system is:  
 a)  $1.215 \times 10^3$  J                                      b)  $12.15 \times 10^3$  J                                      c)  $121.5 \times 10^3$  J                                      d) None of these
18. The heat evolved during the combustion of 112 litre of water gas (mixture of equal volume of H<sub>2</sub> and CO) is :  
 $H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(g); \Delta H = -241.8 \text{ kJ}$   
 $CO(g) + \frac{1}{2}O_2(g) \rightarrow CO_2(g); \Delta H = -283 \text{ kJ}$   
 a) 241.8 kJ                                      b) 283 kJ                                      c) -1312 kJ                                      d) 1586 kJ
19. Work done in reversible adiabatic process is given by:  
 a)  $2.303 RT \log \frac{V_2}{V_1}$                                       b)  $\frac{nR}{(\gamma-1)}(T_2 - T_1)$                                       c)  $2.303 RT \log \frac{V_1}{V_2}$                                       d) None of these

20. The H—H bond energy is  $430 \text{ kJ mol}^{-1}$  and Cl—Cl bond energy is  $240 \text{ kJ mol}^{-1}$ .  $\Delta H$  for HCl is  $-90 \text{ kJ}$ . The H—Cl bond energy is about:

a)  $425 \text{ kJ mol}^{-1}$

b)  $213 \text{ kJ mol}^{-1}$

c)  $360 \text{ kJ mol}^{-1}$

d)  $180 \text{ kJ mol}^{-1}$

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