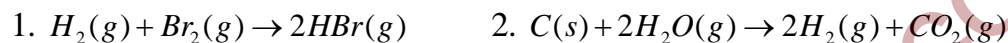


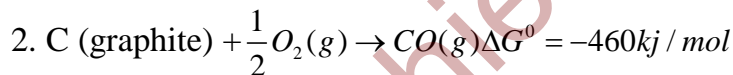
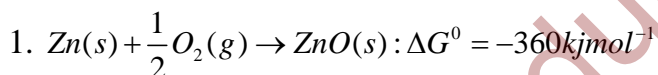
## Thermodynamics

1. Assume each reaction is carried out in an open container. For which reaction will  $\Delta H = \Delta U$ ? (CBSE (MED. 2006))



Ans: 1

2. Consider the following reactions at  $1000^\circ C$

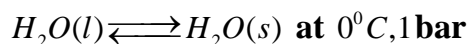


Choose the correct statement at  $1000^\circ C$  (PMT (KERALA) 2006)

- A) Zinc can be oxidized by oxidized by carbon monoxide
- B) ZnO can be reduced by graphite
- C) Both (a) and (b) are true
- D) Both (a) and (b) are false
- E) Carbon monoxide can be reduced by zinc.

Ans: B

3. For a phase change (AIIMS 2006)



- 1)  $\Delta G = 0$     2)  $\Delta S = 0$     3)  $\Delta H = 0$     4)  $\Delta U = 0$

Ans: 1

4. A reaction is non-spontaneous when (AMU (MEDICAL) 2006)

- 1)  $\Delta H$  is +ve,  $\Delta S$  is -ve                      2) Both  $\Delta H$  and  $\Delta S$  are -ve  
3)  $\Delta H$  is -ve and  $\Delta S$  is +ve                      4) None of the above

Ans: 1

5. The enthalpy and entropy changes for the reaction



respectively. The temperature at which the reaction will be equilibrium is

(CBSE (MED) 2006)

- 1) 285.57k                      2) 273.k                      3) 450k                      4) 300k

Ans: 1

6. If 150kJ of energy is needed for muscular work to walk a distance of 1 km, then how much of glucose one has to consume to walk a distance of 5 km, provided only 30% of energy is available for muscular work. The enthalpy of combustion of glucose is  $3000 \text{ kJ mol}^{-1}$  (PMT (KERALA) 2007)

- 1) 75 g                      2) 30g                      3) 180g                      4) 150g                      5) 45g

Ans: 4

7. The enthalpy of combustion of cyclohexane, cyclohexene and  $H_2$  at room temperature are respectively -3920, -3800 and -241  $\text{kJ mol}^{-1}$ . The heat of hydrogenation of cyclohexene is (AIIMS2007)

- 1)  $-12 \text{ kJ mol}^{-1}$                       2)  $121 \text{ kJ mol}^{-1}$                       3)  $-242 \text{ kJ mol}^{-1}$                       4)  $242 \text{ kJ mol}^{-1}$

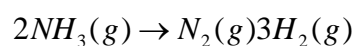
Ans: 1

8. In a closed container a liquid is stirred with a paddle to increase the temperature which of the following is true (PMT PB.)2007

- 1)  $\Delta U = w \neq 0, q = 0$       2)  $\Delta U = w = 0, q \neq 0$   
3)  $\Delta U = 0, w =, q \neq 0$       4)  $w = 0, \Delta U = q \neq 0$

Ans: 1

9. The value of  $\Delta H - \Delta U$  for the following reaction at  $27^\circ \text{C}$  will be



[AMU (MED. 2007)]

- 1)  $8.314 \times 273 \times (-2)$       2)  $8.314 \times 300 \times (-2)$   
3)  $8.314 \times 273 \times 2$       4)  $8.314 \times 300 \times 2$

Ans: 2

10. Unit of entropy is (PMT (Punjab) 2007)

- 1)  $\text{J K}^{-1} \text{mol}^{-1}$       2)  $\text{J mol}^{-1}$       3)  $\text{J}^{-1} \text{K}^{-1} \text{mol}^{-1}$       4)  $\text{J kmol}^{-1}$

Ans: 1

11. For a reaction to be spontaneous in neither direction, which of the following is/ are correct regarding the closed system. (BHU (mains) 2007)

- 1)  $(\Delta G)T, p = 0$       2)  $(\Delta G)T, p < 0$       3)  $(\Delta S)U, v = 0$       4)  $(\Delta S)U, v > 0$

Codes:

- a. 1, 2 and 3 are correct      b. 1 and 2 are correct  
c. 2 and 4 are correct      d. 1 and 3 are correct

Ans: d

12. Given that bond energies of H- H and Cl -Cl bonds are 430kJ/mol and 240 kJ/mol respectively  $\Delta H_f$  for HCl is -90kJ/mol Bond enthalpy of HCl is

(CBSE (MED. 2007))

- 1) 380kJ mol<sup>-1</sup>      2) 425KJ mol<sup>-1</sup>      3. 245 KJ mol<sup>-1</sup>      4. 290KJ mol<sup>-1</sup>

Ans: 2

13. The amount of heat released, when 20 mL of 0.5 M NaOH is mixed with 100 mL of 0.1 M HCl , is x kJ The heat of neutralization (in kJ mol<sup>-1</sup>) is

(BHU (mains2007))

- 1) -100x      2) -50x      3) +100x      4) +50x

Ans: 1

14. For the gas phase reaction,  $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$  Which of the following conditions are correct (CBSE PMT Pre. 2008)

- 1)  $\Delta H < 0, \Delta S < 0$       2.  $\Delta H > 0$  and  $\Delta S < 0$   
3.  $\Delta H = 0, \Delta S < 0$       4.  $\Delta H > 0$  and  $\Delta S > 0$

Ans: 4

15. Which of the following is correct? (BHU (screening) 2008)

- 1)  $C_v = \left( \frac{\partial U}{\partial T} \right)_p$       2)  $C_p = \left( \frac{\partial H}{\partial T} \right)_v$       3)  $C_p - C_v = R$       4)  $\left( \frac{\partial U}{\partial V} \right)_t = \frac{-a}{V^2}$

Ans: 3

16. What will be the heat of formation of methane, if the heat of combustion of carbon is “-x” kj, heat of formation of water is “-y” kj and heat of combustion of methane is”-z” kj (AIIMS 2008)

1)  $(-x-y+z)$  kj      2)  $(-z-x+2y)$ kj      3)  $(-x-2y-z)$  kj      4)  $(-x-2y+z)$ kj

Ans: 4

17. 4.48 L of an ideal gas at S.T.P. requires 12 calories to raise its temperature by  $15^\circ\text{C}$  at constant volume the  $C_p$  of the gas is (PMT (kerala)2009)

1) 3cal      2) 4cal      3) 7cal      4) 6cal      5) 9cal

Ans: 2

18. For vaporisation of water at 1 atmospheric pressure the value of  $\Delta H$  and  $\Delta S$  are  $40.63 \text{ kJ mol}^{-1}$  and  $108.8 \text{ J K}^{-1} \text{ mol}^{-1}$  respectively The temperature when Gibbs free energy change ( $\Delta G$ ) for transformation will be zero, is

(CBSE (PMT) 2010)

1) 273.4 K      2) 393.4K      3) 373.4 K      4) 293.4 K

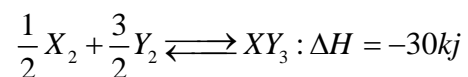
Ans: 3

19. The heat liberated when 1.89 g of benzoic acid is burnt in a bomb calorimeter at  $25^\circ\text{C}$  increases the temperature of 18.94kg of water by  $0.632^\circ\text{C}$  If the specific heat of water at  $25^\circ\text{C}$  is  $0.998 \text{ cal g}^{-1} \text{ deg g}^{-1}$ , the specific heat of combustion of benzoic acid is (AFMC 2010)

1) 88.1      1 kcal      2) 771.4 kcal      3) 98.1.1 kcal      4) 871.2 kcal

Ans: 2

20. Standard entropies of  $X_2, Y_2$  and  $XY_3$  are 60, 40 and 50  $JK^{-1}mol^{-1}$  respectively. For the reaction



To be at equilibrium, the temperature should be (CBSE (PMT) 2010)

1) 750 K

2) 1000K

3) 1250 K

4) 500K

Ans: 1