DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : CHEMISTRY**
DATE : **DPP No. : 3**

Topic :- THERMODYNAMICS

1. $H_2(g) + Cl(g) = 2HCl(g)$; $\Delta H(298\ K) = 22.06$ kcal. For this reaction, ΔU is equal to:
   a) $-22.06 + 2 \times 10^{-3} \times 298 \times 2$ kcal
   b) $-22.06 + 2 \times 298$ kcal
   c) $-22.06 - 2 \times 298 \times 4$ kcal
   d) -22.06 kcal
2. The heat change taking place during the reaction $H_2O(l) \rightarrow H_2O(g)$ is: [Given, ΔH_f of $H_2O(g) = -57$ kcal, $\Delta H_f = H_2O(l) = -68.3$ kcal]
   a) $+11.3$ kcal b) -11.3 kcal c) -115.3 kcal d) $+115.3$ kcal
3. ΔH for $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$ is 176 kJ mol^{-1} at 1240 K. The ΔU for the change is equal to:
   a) 160 kJ b) 165.6 kJ c) 186.3 kJ d) 180.0 kJ
4. When one mole of monoatomic ideal gas at TK undergoes adiabatic change under a constant external pressure of 1 atm changes volume from 1 L to 2 L. The final temperature in Kelvin would be
   a) $\frac{T}{2^{2/3}}$ b) $T + \frac{2}{3 \times 0.0821}$ c) T d) $T - \frac{2}{3 \times 0.0821}$
5. $\Delta H°$,(298 K)of methanol is given by the chemical equation
   a) $CH_4(g) + \frac{1}{2}O_2(g) \rightarrow CH_3OH(g)$ b) $C(graphite) + \frac{1}{2}O_2(g) + 2H_2(g) \rightarrow CH_3OH(l)$
   c) $C(diamond) + \frac{1}{2}O_2(g) \rightarrow CH_3OH(l)$ d) $CO(g) + 2H_2(g) \rightarrow CH_3OH(l)$
6. For the reaction, $C_2H_4(g) + 3O_2(g) \longrightarrow 2CO_2(g) + 2H_2O$; $\Delta U = -1415$ kJ. Then ΔH at 27°C is :
   a) -1410 kJ b) -1420 kJ c) $+1420$ kJ d) $+1410$ KJ
7. The heat of combustion of ethanol determined by a bomb calorimeter is -670.48 kcal mol^{-1} at 25°C. What is ΔU at 25°C for the following reaction?
   $C_2H_5OH(l) + \frac{7}{2}O_2(g) \rightarrow 2CO_2(g) + 3H_2O(g)$
   a) -335.24 kcal b) -669.28 kcal c) -670.48 kcal d) $+670.48$ kcal
8. Which has the least entropy?
   a) Graphite b) Diamond c) $N_2(g)$ d) $N_2O(g)$

9. A carnot engine operates between temperature T and 400 K ($T > 400$ K). If efficiency of engine is 25%, the temperature T is:
   a) 400 K b) 500 K c) 533.3 K d) 600 K
10. It is a general principle that if a system has the less energy then it is:
   a) More stable b) Less stable c) Unstable d) More unstable
11. For the reaction, $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, which is true?
   a) $\Delta H = \Delta U$ b) $\Delta H < \Delta U$ c) $\Delta H > \Delta U$ d) None of these
12. $H_2 + \frac{1}{2}O_2 \rightarrow H_2O$;
   $\Delta H = -68.39$ kcal.....(i)
   $K + aq. \rightarrow KOH(aq) + \frac{1}{2}H_2$;
   $\Delta H = -48$ kcal.....(ii)
   $KOH + aq. \rightarrow KOH(aq)$;
   $\Delta H = -14$ kcal.....(iii)
   The heat of formation (in kcal) of KOH is :
   a) $-68.39 + 48 - 14$
   b) $-68.39 - 48 + 14$
   c) $68.39 - 48 + 14$
   d) $68.39 + 48 + 14$
13. Which of the following expressions represents the first law of thermodynamics?
   a) $\Delta E = -q + W$ b) $\Delta E = q - W$ c) $\Delta E = q + W$ d) $\Delta E = -q - W$
14. A thermodynamic state function is:
   a) One which obeys all the laws of thermodynamics
   b) A quantity which is used to measure thermal changes
   c) A quantity whose value is independent of the path
   d) A quantity which is used to express pressure-volume work
15. When two atoms of hydrogen combine to form a molecule of hydrogen gas, the energy of the molecule is:
   a) Greater than that of separate atoms
   b) Equal to that of separate atoms
   c) Lower than that of separate atoms
   d) Sometimes lower and sometimes higher
16. The enthalpies of formation of N_2O and NO are 28 and 90 kJ mol^{-1} respectively. The enthalpy of the reaction, $2N_2O(g) + O_2(g) \longrightarrow 4NO(g)$ is equal to :
   a) 8 kJ b) 88 kJ c) -16 kJ d) 304 kJ
17. Heat of combustion of CH_4, C_2H_4, C_2H_6 are $-890, -1411$ and -1560 kJ/mol respectively. Which has the lowest calorific fuel value in kJ/g?
   a) CH_4 b) C_2H_4 c) C_2H_6 d) All same
18. Given that $\Delta H_{r298\,K} = -54.07$ kJ mol^{-1} and $\Delta S^{\circ}_{r298\,K} = 10$ J mol^{-1} and $R = 8.314$ $JK^{-1}mol^{-1}$. The value of $\log_{10} K$ for a reaction, $A \rightleftharpoons B$ is:
   a) 5 b) 10 c) 95 d) 100

19. Hess's law is based on
    a) Law of conservation of mass
    b) Law of conservation of energy
    c) First law of thermodynamics
    d) None of the above
20. What is the entropy change (in $JK^{-1}mol^{-1}$) when one mole of ice is converted into water at 0°C?
    (The enthalpy change for the conversion of ice to liquid water is 6.0 kJ mol^{-1} at 0°C)
    a) 20.13
    b) 2.013
    c) 2.198
    d) 21.98