

## Assignments Week-6

### Assignment-1

Maximum work available from a system can be more than change in its internal energy when

(A)  $\Delta H > 0$

(B)  $\Delta G = 0$

(C)  $\Delta S > 0$

(D)  $\Delta V > 0$

### Assignment 2

Electrical work obtainable from a system is given by

(A)  $\Delta H - T\Delta S$

(B)  $\Delta U - p\Delta V$

(C)  $\Delta U - T\Delta S$

(D)  $T\Delta S + V\Delta p$

### Assignment 3

$dU = TdS - pdV$  leads to the following Maxwell equation

(A)  $\left(\frac{\partial T}{\partial V}\right)_S = -\left(\frac{\partial p}{\partial S}\right)_V$

(B)  $\left(\frac{\partial S}{\partial V}\right)_T = -\left(\frac{\partial V}{\partial S}\right)_p$

(C)  $\left(\frac{\partial T}{\partial S}\right)_V = -\left(\frac{\partial p}{\partial V}\right)_S$

(D)  $\left(\frac{\partial V}{\partial T}\right)_S = -\left(\frac{\partial S}{\partial p}\right)_V$

#### **Assignment 4**

The equation  $dU = TdS - pdV$  applies to

- (A) irreversible changes
- (B) reversible changes
- (C) both reversible and irreversible changes
- (D) cyclic process only

#### **Assignment 5**

Spontaneity of a process can be predicted from the knowledge of

- (A) enthalpies of formation of reactants and products
- (B) free energies of formation of reactants and products
- (C) entropies of reactants and products
- (D) enthalpies of formation and entropies of reactants and products

#### **Assignment 6**

At constant 298 K, with increase in pressure of a perfect gas by 10 fold, the Gibbs energy per mol [R is gas constant]

- (A) decreases by  $298R\ln 100$
- (B) increases by  $298R\ln 10$
- (C) increases by  $2980R$
- (D) decreases by  $10R$

#### **Assignment 7**

If a process requires a sharp change in entropy of a substance with rise in temperature, the best phase of substance to be chosen will be

- (A) gaseous
- (B) liquid
- (C) solid
- (D) liquid crystalline

### **Assignment 8**

With increase in pressure at constant temperature, the Gibbs energy of a substance will change by maximum amount for

- (A) liquid phase
- (B) gas phase
- (C) solid phase
- (D) super cooled phase

### **Assignment 9**

The Gibbs energy per mol of a pure substance is  $10 \text{ kJ mol}^{-1}$  at 298 K. The value of its chemical potential in  $\text{kJ mol}^{-1}$  is

- (A) 2980
- (B) 10
- (C) 29.8
- (D) 2.98

### **Assignment 10**

Up to 10 bar, with increase in pressure at a constant temperature for liquid water and ice, the Gibbs energy change is expressed by

- (A)  $\Delta G(\text{ice}) = \Delta G(\text{liquid water})$
- (B)  $\Delta G(\text{ice}) > \Delta G(\text{liquid water})$
- (C)  $\Delta G(\text{ice}) < \Delta G(\text{liquid water})$
- (D)  $\Delta G(\text{ice}) = 0$ ;  $\Delta G(\text{liquid water}) > 0$