



## Exam-3 [Thermodynamics] NEET

(System, Properties, Process, FLOT, Heat capacity, Enthalpy, Isothermal, Adiabatic process)

1. During an isothermal expansion of an ideal gas its :

- (1) internal energy increases (3) enthalpy remains unaffected  
(2) enthalpy decreases (4) enthalpy reduces to zero

2. The latent heat of vaporization of a liquid at 500 K and 1 atm pressure is 10 kcal/mol. What will be the change in internal energy ( $\Delta U$ ) of 3 mole of the liquid at the same temperature and pressure?

- (1) 13 kcal (3) 27 kcal  
(2) -13 kcal (4) -27 kcal

3. One mole of an ideal gas at 300K is expanded isothermally from an initial volume of 1 litre to 10 litres. The  $\Delta E$  for this process is:  
( $R = 2 \text{ cal mol}^{-1} \text{ K}^{-1}$ )

- (1) 163.7 Cal (3) 138.1 Cal  
(2) zero (4) 9 lit-atm

4. When 1 mol gas is heated at constant volume, temp. is raised from 298K to 308K. Heat supplied to the gas is 500 J. Then which statement is correct?

- (1)  $q = w = 500 \text{ J}, \Delta U = 0$  (3)  $w = 500 \text{ J}, \Delta U = 0$   
(2)  $q = \Delta U = 500 \text{ J}, w = 0$  (4)  $\Delta U = q, w = -500 \text{ J}$

5. In a closed insulated container a liquid is stirred with a paddle to increase the temperature which of the following is true?

- (1)  $\Delta E = W \neq 0, q = 0$  (3)  $\Delta E = 0, W = q \neq 0$   
(2)  $\Delta E = W = q \neq 0$  (4)  $W = 0, \Delta E = q \neq 0$

6. 2 mole of ideal gas at 27°C temp. is expanded reversibly from 2 lit. to 20 lit. Find enthalpy change.

( $R = 2 \text{ cal/mol K}$ )

- (1) 9.21 (3) 4  
(2) 0 (4) 9.2

7. For the reaction :

$\text{C}_3\text{H}_8(\text{g}) + 5\text{O}_2(\text{g}) \rightarrow 3\text{CO}_2(\text{g}) + 4\text{H}_2\text{O}(\text{l})$  at constant temperature,  $\Delta H - \Delta E$  is:

- (1)  $+3 RT$  (3)  $+3 RT$   
 (2)  $-3 RT$  (4)  $-3 RT$
8. **The work done during the expansion of a gas from a volume of  $4 \text{ dm}^3$  to  $6 \text{ dm}^3$  against a constant external pressure of  $3 \text{ atm}$  is:**
- (1)  $-608 \text{ J}$  (3)  $-304 \text{ J}$   
 (2)  $+304 \text{ J}$  (4)  $+608 \text{ J}$
9. **For the reaction of one mole of zinc dust with one mole of sulphuric acid in a bomb calorimeter,  $\Delta U$  and  $w$  correspond to:**
- (1)  $\Delta U < 0, w = 0$  (3)  $\Delta U > 0, w = 0$   
 (2)  $\Delta U < 0, w < 0$  (4)  $\Delta U > 0, w > 0$
10.  **$4.48 \text{ L}$  of an ideal gas at S.T.P. requires  $12 \text{ calories}$  to raise its temperature by  $15^\circ\text{C}$  at constant volume. The  $C_v$  of the gas is :**
- (1)  $3 \text{ cal/K mol}$  (3)  $7 \text{ cal/K mol}$   
 (2)  $4 \text{ cal/K mol}$  (4)  $6 \text{ cal/K mol}$
11. **The molar heat capacity of water at constant pressure, is  $75 \text{ JK}^{-1} \text{ mol}^{-1}$ . When  $1.0 \text{ kg}$  of heat is supplied to  $100 \text{ g}$  of water which is free to expand the increase in temperature of water is:**
- (1)  $1.2 \text{ K}$  (3)  $4.8 \text{ K}$   
 (2)  $2.4 \text{ K}$  (4)  $6.6 \text{ K}$
12. **Which of the following is correct option for free expansion of an ideal gas under adiabatic condition?**
- (1)  $q \neq 0, \Delta T < 0, w > 0$  (3)  $q \neq 0, \Delta T = 0, w = 0$   
 (2)  $q = 0, \Delta T = 0, w = 0$  (4)  $q = 0, \Delta T > 0, w = 0$
13. **If  $400 \text{ kJ}$  work is done by the system and  $150 \text{ kJ}$  heat is given to the system then what will be effect on internal energy?**
- (1) Increases by  $250 \text{ kJ}$  (3) Increases by  $600 \text{ kJ}$   
 (2) Decreases by  $250 \text{ kJ}$  (4) Decreases by  $600 \text{ kJ}$
14. **For gas 'A' in a calorimeter heat evolved is  $250 \text{ kJ/mol}$ . For  $0.2 \text{ mol}$  of A, temperature rise from  $298 \text{ K}$  to  $300 \text{ K}$ . Find out heat capacity of calorimeter.**
- (1)  $12.5 \text{ kJ/K}$  (3)  $50 \text{ kJ/K}$   
 (2)  $25 \text{ kJ/K}$  (4)  $100 \text{ kJ/K}$
15. **During adiabatic expansion of an ideal gas in vacuum:**
- (1)  $q = 0$  and  $\Delta U \neq 0$  (3)  $q \neq 0$  and  $\Delta U = 0$   
 (2)  $q = 0$  and  $\Delta U = 0$  (4)  $q \neq 0$  and  $\Delta U \neq 0$

16. A gas is allowed to expand in a well insulated container against a constant external pressure of 2.5 atm from a volume of 2.50 L to a final volume of 4.50 L. The change in internal energy  $\Delta U$  of the gas in joules will be:

- (1)  $-500 \text{ J}$  (3)  $+505 \text{ J}$   
 (2)  $-505 \text{ J}$  (4)  $1136.25 \text{ J}$

17. Which one among the following is the correct option for relationship between  $C_p$  and  $C_v$  for one mole of ideal gas?

- (1)  $C_p = RC_v$  (3)  $C_p - C_v = R$   
 (2)  $C_p + C_v = R$  (4)  $C_p = RC_v$

18. Which amongst the following options is the correct relation between change in enthalpy and change in internal energy?

- (1)  $\Delta H = \Delta U + \Delta n_g RT$  (3)  $\Delta H - \Delta U = \Delta n_g R$   
 (2)  $\Delta H - \Delta U = \Delta n RT$  (4)  $\Delta H - \Delta U = \Delta n_f RT$

19. Match List-I with List-II:

List-I (Process)	List-II (Conditions)
A. Isothermal process	I. No heat
B. Isochoric process	II. Constant temperature
C. Isobaric process	III. Constant volume
D. Adiabatic process	IV. Constant pressure

- (1) A-II, B-III, C-II, D-I (3) A-I, B-II, C-III, D-IV  
 (2) A-II, B-III, C-IV, D-I (4) A-II, B-III, C-IV, D-III

20. The work done during reversible isothermal expansion of one mole of hydrogen gas at  $25^\circ\text{C}$  from pressure of 20 atmosphere to 10 atmosphere is: ( $R=2 \text{ cal mol}^{-1} \text{ K}^{-1}$ ,  $\log 2=0.3$ )

- (1) 0 calorie (3) 413.14 calories  
 (2) -413.14 calories (4) 100.40 calories

21. One mole of an ideal gas expands isothermally and reversibly from  $10\text{dm}^3$  to  $20\text{dm}^3$  at  $300\text{K}$ .  $\Delta U$ ,  $q$  and work done in the process respectively are (Given:  $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$ ,  $\ln 2 = 0.693$ ):

- (1) 0, 21.84 kJ, -1.726 J (3) 0, -21.84 kJ, 21.84 kJ  
 (2) 0, 21.84 kJ, 21.84 kJ (4) 0, -17.18 kJ, 17.18 kJ

22. When 2 litre of ideal gas expands isothermally into vacuum to a total volume of 6 litre, the change in internal energy is:

- (1) 0 (3) 8  
 (2) 2 (4) 15