DPP No: 18

Maximum Time 50 Min

Chemistry

TARGET JEE-MAINS

SYLLABUS : Thermodynamics

1. Out of boiling point (I), entropy (II), pH (III) and e.m.f. of a cell (IV), intensive properties are :

(A) I, II (B) I, II, III (C) I, III, IV (D) All of the above

2. Which among the following is not a state function -

(A) Internal energy (B) Free energy (C) Work (D) Enthalpy

3. A gaseous system changes from state A (P_1, V_1, T_1) to B (P_2, V_2, T_2), B to C (P_3, V_3, T_3) and finally from C to A. The whole process may be called :

(A) Reversible process (B) Cyclic process

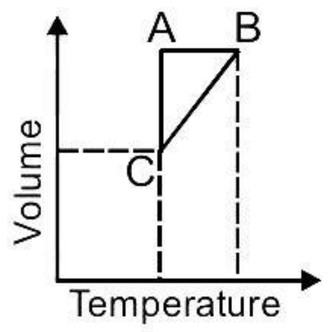
(C) Isobaric process (D) Spontaneous process

4. A well stoppered thermoflask contains some ice cubes. This is an example of a-

(A) Closed system (B) Open system

(C) Isolated system (D) Non-thermodynamic system

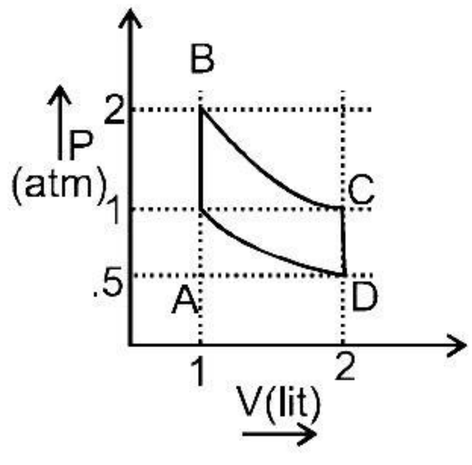
5. Five moles of a gas is put through a series of changes as shown graphicallay in a cyclic process the A $\rightarrow$ B, B $\rightarrow$ C and C $\rightarrow$ A respectively are

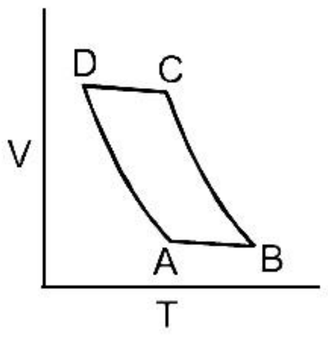


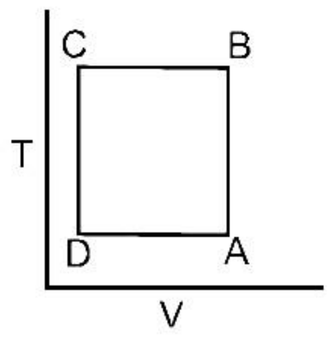
(A) Isochoric, Isobaric, Isothermal (B) Isobaric, Isochoric, Isothermal

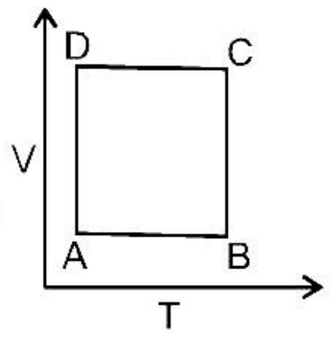
(C) Isothermal, Isobaric, Isochoric (D) Isochoric, Isothermal, Isobaric

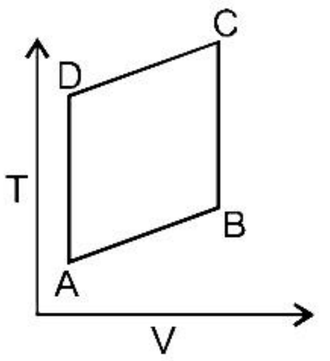
6. A cycle process ABCD is shown in P-V diagram for an ideal gas which of the diagram represent the same process.



(A) 

(B) 

(C) 

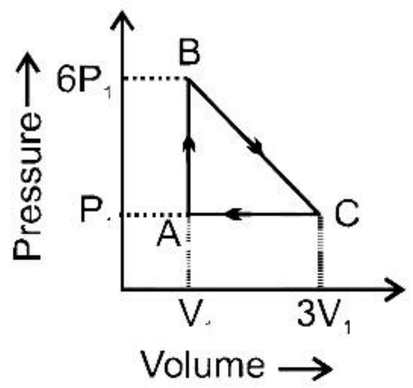
(D) 

7. The work done in ergs for the reversible expansion of one mole of an ideal gas from a volume of 10 litres to 20 litres at 25^0C is :

(A) – 2.303 × 298 × 0.082 log2 (B) – 298 × 10^7 × 8.31 × 2.3031 log2

(C) – 2.303 × 298 × 0.082 log0.5 (D) – 8.31 × 10^7 × 298 × 2.303 log0.5

8. An ideal gas is taken around the cycle ABCA as shown in P-V diagram. The net work done by the gas during the cycle is equal to :



(A) $12P_1V_1$ (B) $6P_1V_1$ (C) $5P_1V_1$ (D) P_1V_1

9. A gas is allowed to expand at constant pressure from a volume of 1.0 litre to 10.0 litre against an external pressure of 0.50 atm. If the gas absorbs 250 J of heat from the surroundings, what are the values of q, w and ΔE ? (Given 1 L atm = 101 J)

	q	**w**	**ΔE**
(A)	250 J	– 455 J	– 205 J
(B)	–250 J	– 455 J	– 710 J
(C)	250 J	455 J	710 J
(D)	–250 J	455 J	205 J

10. For 2 mole of an ideal gas; the relation between C_p & C_v (non-molar) are :

(A) $C_p - C_v = 2R$ (B) $C_v - C_p = 2R$ (C) $C_p - C_v = R$ (D) $C_v - C_p = R$

11. The work done on the system when one mole of an ideal gas at 500 K is compressed isothermally and reversibly to 1/10th of its original volume (R = 2 cal) -

(A) 500 kcal (B) 1.51 kcal (C) – 23.03 kcal (D) 2.303 kcal

12. In an isochoric process the increase in internal energy is

(A) Equal to the heat absorbed

(B) Equal to the heat evolved

(C) Equal to the work done

(D) Equal to the sum of the heat absorbed and work done

13. The difference between ΔH and ΔE at constant volume is equal to -

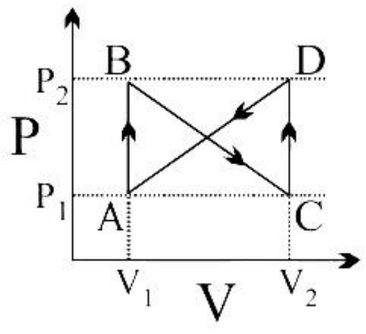
(A) R (B) $P\Delta V$ (C) $V\Delta P$ (D) 3/2 R.

14. The temperature of the system decreases in an

(A) Adiabatic compression (B) Isothermal compression

(C) Isothermal expansion (D) Adiabatic expansion

15. An ideal gas is taken around the cycle ABCDA as shown in figure. The net work done during the cycle is equal to :



(A) zero (B) positive (C) negative (D) we cannot predict

16. 1 mole of NH_3 gas at 27°C is expanded in reversible adiabatic condition to make volume 8 times (γ = 1.33). Final temperature and work done respectively are :

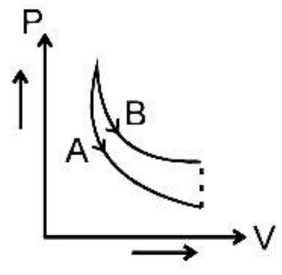
(A) 150 K, 900 cal (B) 150 K, 400 cal

(C) 250 K, 1000 cal (D) 200 K, 800 cal

17. One mole of ideal gas is allowed to expand reversibly and adiabatically from a temperature of 27°C. If the work done by the gas in the process is 3 kJ, the final temperature will be equal to (C_V=20 J/K mol)

(A) 100 K (B) 450 K (C) 150 K (D) 400 K

18. In figure, A and B are two adiabatic curves for two different gases. Then A and B corresponds to:



(A) Ar and He respectively (B) He and H_2 respectively

(C) O_2 and H_2 respectively (D) H_2 and He respectively

INTEGER VALUE QUETION

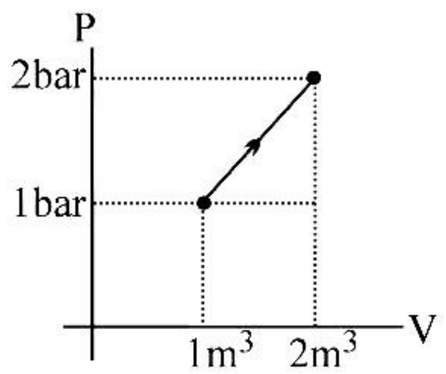
19. An ideal gas expands in volume from 1×10^{-3} m^3 to 1×10^{-2} m^3 at 300 K against a constant pressure of 1×10^5 Nm^{-2}. The work done is (in J) -

20. Calculate the work done by 0.1 mole of a gas at 27^0 C to double its volume at constant pressure (R = 2 cal mol^{-1} K^{-1}) (in cal)

21. A system absorb 600J of heat and work equivalent to 300J on its surroundings. The change in internal energy is (in J)

22. A system undergoes a process which absorbed 5 kJ of heat and undergoing an expansion against external pressure of 1 atm, during the process change in internal energy is 300 J. Then predict the change in volume (lit.)

23. What is ΔU for the process described by figure. Heat supplied during the process q = 100 kJ. (in J)



24. What is the change in internal energy when a gas contracts from 377 ml to 177 ml under a constant pressure of 1520 torr, while at the same time being cooled by removing 124 J heat? (in J) **[Take : (1 L atm) = 100 J]**

25. The work done by a system is 8 joule, when 40 joule heat is supplied to it. What is the increase in internal energy of system. (in J)