



Chapter : THERMODYNAMICS

Assignment 1

Class 11

DPP

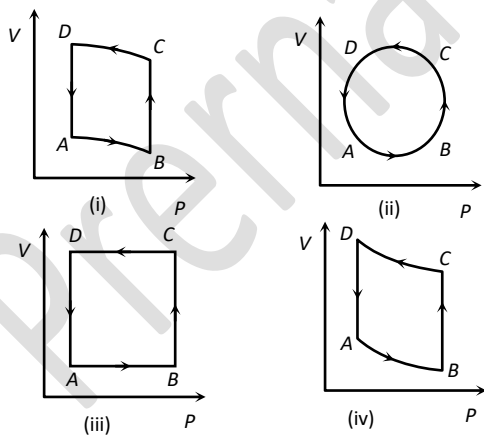
DAILY PRACTICE PROBLEMS

CLASS : XITH
DATE :

SUBJECT : PHYSICS
DPP NO. : 1

Topic :- THERMODYNAMICS

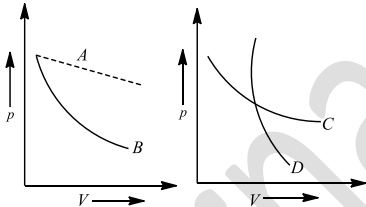
- In an isothermal change, an ideal gas obeys
 - Boyle's law
 - Charle's law
 - Gaylussac law
 - None of the above
- In a thermodynamic system working substance is ideal gas, its internal energy is in the form of
 - Kinetic energy only
 - Kinetic and potential energy
 - Potential energy
 - None of these
- One mole of an ideal gas requires 207 J heat to raise the temperature by 1K, when heated at constant pressure. If the same gas is heated at constant volume to raise the temperature by the same range, the heat required will be (Take $R = 8.3 \text{ Jmol}^{-1} \text{ K}^{-1}$)
 - 215.3 J
 - 198.7 J
 - 207 J
 - None of these
- In the diagram (i) to (iv) of variation of volume with changing pressure is shown. A gas is taken along the path ABCD. The change in internal energy of the gas will be



- Positive in all cases (i) to (iv)
- Positive in cases (i), (ii) and (iii) but zero in (iv) case
- Negative in cases (i), (ii) and (iii) but zero in (iv) case
- Zero in all four cases

5. Efficiency of a Carnot engine is 50% when temperature of outlet is 500 K. In order to increase efficiency up to 60% keeping temperature of intake the same what is temperature of outlet
 a) 200 K b) 400 K c) 600 K d) 800 K
6. The efficiency of Carnot's heat engine is 0.5, when the temperature of the source is T_1 and that of sink is T_2 . The efficiency of another Carnot's heat engine is also 0.5. The temperature of source and sink of the second engine are respectively
 a) $2T_1, 2T_2$ b) $2T_1, \frac{T_2}{2}$ c) $T_1 + 5, T_2 - 5$ d) $T_1 + 10, T_2 - 10$
7. A litre of dry air at STP allowed to expand to a volume of 3 L under adiabatic conditions. If $\gamma = 1.40$, the work done is ($3^{1.4} = 4.6555$)
 a) 48 J b) 60.7 J c) 90.5 J d) 100.8 J
8. We consider a thermodynamic system. If ΔU represents the increase in its internal energy and W the work done by the system, which of the following statements is true?
 a) $\Delta U = -W$ in an adiabatic process b) $\Delta U = W$ in an isothermal process
 c) $\Delta U = -W$ in an isothermal process d) $\Delta U = W$ in an adiabatic process
9. By opening the door of a refrigerator inside a closed room, the room temperature
 a) Remains constant b) Decreases c) Increases d) None of these

10. In the following figure, four curves A, B, C and D are shown. The curves are



- a) Isothermal for A and D while adiabatic for B and C
 b) Adiabatic for A and C while isothermal for B and D
 c) Isothermal for A and B while adiabatic for C and D
 d) Isothermal for A and C while adiabatic for B and D
11. During adiabatic expansion of 10 moles of a gas, the internal energy decreases by 50 J. Work done during the process is
 a) +50 J b) -50 J c) Zero d) Cannot say
12. For which of the following processes is the entropy change zero
 a) Isobaric b) Isothermal c) Adiabatic d) None of the above
13. For adiabatic processes ($\gamma = \frac{c_p}{c_v}$)
 a) $P^\gamma V = \text{constant}$ b) $T^\gamma V = \text{constant}$ c) $TV^{\gamma-1} = \text{constant}$ d) $TV^\gamma = \text{constant}$

14. The change in the entropy of a 1 mole of an ideal gas which went through an isothermal process from an initial state (p_1, V_1, T) to the final state (p_2, V_2, T) is equal to
 a) Zero b) $R \ln T$ c) $R \ln \frac{V_1}{V_2}$ d) $R \ln \frac{V_2}{V_1}$
15. In an adiabatic change, the pressure and temperature of monoatomic gas are related with relation $p \propto T^C$, where C is equal to
 a) $\frac{5}{4}$ b) $\frac{5}{3}$ c) $\frac{5}{2}$ d) $\frac{3}{5}$
16. The ratio of the slopes of $p - V$ graphs of adiabatic and isothermal is
 a) $\frac{\gamma-1}{\gamma}$ b) $\gamma - 1$ c) $\gamma/1$ d) γ
17. If 300 ml of a gas at 27°C is cooled to 7°C at constant pressure, then its final volume will be
 a) 540 ml b) 350 ml c) 280 ml d) 135 ml
18. A Carnot engine whose sink is at 300 K has an efficiency of 40%. By how much should the temperature of source be increased so as to increase its efficiency by 50% of original efficiency?
 a) 280 K b) 275 K c) 325 K d) 250 K
19. An ideal heat engine exhausting heat at 27°C is to have 25% efficiency. It must take heat at
 a) 127°C b) 227°C c) 327°C d) None of these
20. A gas expands under constant pressure P from volume V_1 to V_2 . The work done by the gas is
 a) $P(V_2 - V_1)$ b) $P(V_1 - V_2)$ c) $P(V_1^\gamma - V_2^\gamma)$ d) $P \frac{V_1 V_2}{V_2 - V_1}$