CBSE

THERMODYNAMICS WS 14

Class 11 - Physics

Section A

1. A system, after passing through different states returns back to its original state, is called. **[1]**

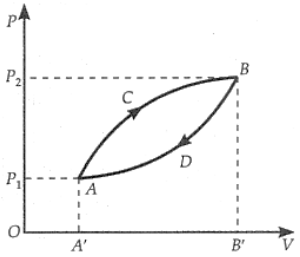
   a) isothermal process

   b) adiabatic process

   c) cyclic process

   d) isobaric process

2. A thermodynamic system is taken from state A to B along ACB and is brought back to A along BDA as shown in the given P-V diagram. The net work done during the complete cycle is given by the area: **[1]**



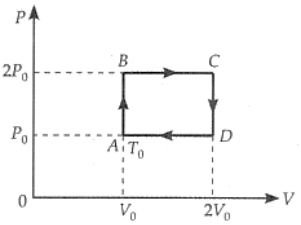
   a) ACBDA

   b) ACB$B'A'$A

   c) ACB$B'A'$A

   d) $P_1ACBP_2P_1$

3. N moles of a monoatomic gas it carried round the reversible rectangular cycle ABCDA as shown in the diagram. **[1]**



   The temperature at A is T_0. The thermodynamic efficiency of the cycle is:

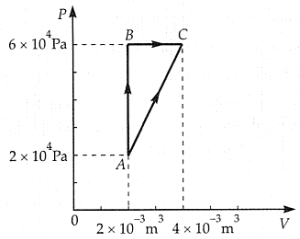
   a) 50%

   b) 25%

   c) 15%

   d) 20%

4. The figure shows two paths that may be taken by a gas to go from a state A to a state C. **[1]**



   In process AB, 400 J of heat is added to the system and in process BC, 100 J of heat is added to the system. The heat absorbed by the system in the process AC will be:

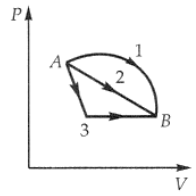
   a) 380 J

   b) 460 J

   c) 500 J

   d) 300 J

5. An ideal gas goes from state A to state B via three different processes as indicated in the P-V diagram. **[1]**



If Q_1, Q_2, Q_3 indicate the heat absorbed by the gas along the three processes and ΔU_1, ΔU_2, ΔU_3 indicate the change in internal energy along the three processes respectively, then

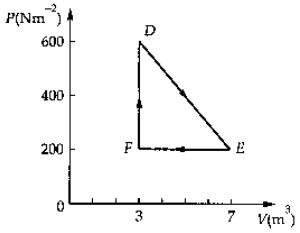
a) $Q_3 > Q_2 > Q_1$ and $\Delta U_1 = \Delta U_2 = \Delta U_3$

b) $Q_3 > Q_2 > Q_1$ and $\Delta U_1 > \Delta U_2 > \Delta U_3$

c) $Q_1 = Q_2 = Q_3$ and $\Delta U_1 > \Delta U_2 > \Delta U_3$

d) $Q_1 > Q_2 > Q_3$ and $\Delta U_1 = \Delta U_2 = \Delta U_3$

6. A thermodynamic process is carried out from an original state D to an intermediate state E by the linear process shown in the figure. **[1]**



The work done by the gas from D to E to F is:

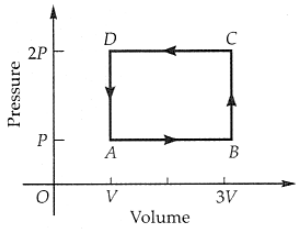
a) 100 J

b) 300 J

c) 800 J

d) 250 J

7. A thermodynamic system is taken through the cycle ABCD as shown in the figure. Heat rejected by the gas during the cycle is: **[1]**



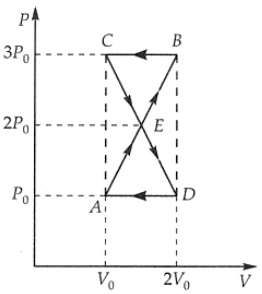
a) 2 PV

b) $\frac{1}{2}$PV

c) 4 PV

d) PV

8. A thermodynamic system undergoes cyclic process ABCDA as shown in the figure. **[1]**



The work done by the system in the cycle is:

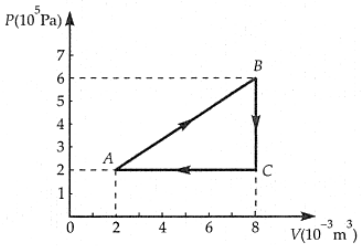
a) P_0V_0

b) Zero

c) $\frac{P_0V_0}{2}$

d) 2 P_0V_0

9. A gas is taken through the cycle A $\rightarrow$ B $\rightarrow$ C $\rightarrow$ A, as shown. **[1]**



What is the net work done by the gas?

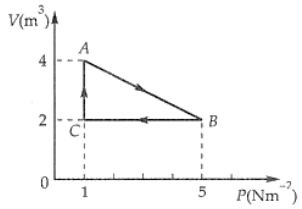
a) Zero

b) 2000 J

c) -2000 J

d) 1000 J

10. An ideal gas is taken through the cycle A $\rightarrow$ B $\rightarrow$ C $\rightarrow$ A, as shown in the figure. If the net heat supplied to the gas in the cycle is 5 J, the work done by the gas in the process A $\rightarrow$ B is: **[1]**



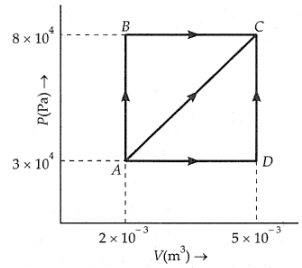
a) ∞

b) 2 J

c) 4 J

d) 3 J

11. A thermodynamic process is shown in the figure. The pressures and volumes corresponding to some points in the figure are $P_A = 3 \times 10^4$ Pa, $V_A = 2 \times 10^{-3}$ m^3, $P_B = 8 \times 10^4$ Pa, $V_D = 5 \times 10^{-3}$ m^3. **[1]**



In process AB, 600 J of heat is added to the system and in process BC, 200 J of heat is added to the system. The change in internal energy of the system in process AC would be:

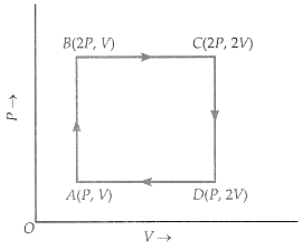
a) 800 J

b) 640 J

c) 600 J

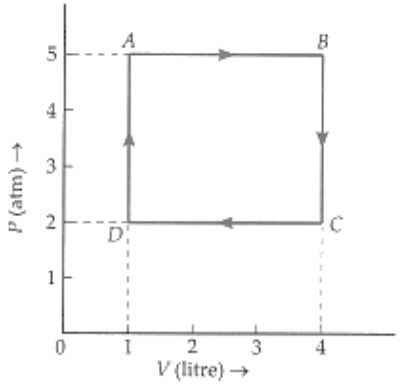
d) 560 J

12. An ideal gas is taken around the cycle ABCDA as shown in the P-V diagram. What is the work done during the cycle? **[1]**



Section B

13. One mole of an ideal gas undergoes a cyclic change ABCD. From the given diagram (Figure), calculate the net workdone in the process. 1 atm = 10^6 dyne cm^{-2}. **[2]**



Section C

14. **Fill in the blanks:** **[3]**

(a) Heat is supplied to a system, but its internal energy does not increase. The process involved is _____. **[1]**

(b) Everything outside the system which can have a direct effect on the system is called its _____. **[1]**

(c) Any process which returns to the initial state after undergoing a series of changes is called a _____. **[1]**