CBSE

THERMODYNAMICS WS 1

Class 11 - Physics

Section A

1. If two systems are in thermal equilibrium with each other, it means their **[1]**

   a) masses and temperatures are equal
   b) temperatures are equal
   c) masses are equal, temperatures may be unequal
   d) masses and temperatures are unequal

2. A mixture of gases undergoing explosive chemical reaction **[1]**

   a) may have variable temperature and pressure values during explosion
   b) finally the gas will attained equilibrium state with its surroundings
   c) is not in equilibrium state during explosion
   d) All of these

3. If C_P and C_V are molar heats at constant pressure and constant volume respectively and R is gas constant for 1 mole, then the correct relation is: **[1]**

   a) $C_p - C_v > R$
   b) $C_p - C_v = 0$
   c) $C_p - C_v = R$
   d) $C_p - C_v < R$

4. Three copper blocks of masses M_1, M_2 and M_3 kg respectively are brought into thermal contact till they reach equilibrium. Before contact, they were at T_1, T_2, T_3 ($T_1 > T_2 > T_3$). Assuming there is no heat loss to the surroundings, the equilibrium temperature T is (s is specific heat of copper) **[1]**

   a) $T = \frac{T_1+T_2+T_3}{3}$
   b) $T = \frac{M_1T_1+M_2T_2+M_3T_3}{M_1+M_2+M_3}$
   c) $T = \frac{M_1T_1s+M_2T_2s+M_3T_3s}{M_1+M_2+M_3}$
   d) $T = \frac{M_1T_1+M_2T_2+M_3T_3}{3(M_1+M_2+M_3)}$

5. **Assertion (A):** The S.I. unit of thermal conductivity is $Wm^{-1} K^{-1}$. **[1]**
   Reason (R): Thermal conductivity is measure of ability of the material to allow the passage of heat through it.

   a) Both A and R are true and R is the correct explanation of A.
   b) Both A and R are true but R is not the correct explanation of A.
   c) A is true but R is false.
   d) A is false but R is true.

6. **Assertion (A):** The heat supplied to a system is always equal to the increase in its internal energy. **[1]**
   Reason (R): When a system changes from one thermal equilibrium to another, some heat is absorbed by it.

   a) Both A and R are true and R is the correct explanation of A.
   b) Both A and R are true but R is not the correct explanation of A.
   c) A is true but R is false.
   d) A is false but R is true.

7. **Assertion:** If two bodies are in thermal equilibrium in one frame, they will be in thermal equilibrium in all frames. **[1]**

Reason: The transfer of energy from a hot body to a cold body is a non mechanical process, i.e., the energy is transferred from one body to the other, without any mechanical work.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

8. **Assertion (A):** If the temperature of two systems is not same it means that they must not be in thermodynamic equilibrium. **[1]**

Reason (R): If the temperature of two systems is same, it means that they must be in thermal equilibrium.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

9. **State True or False:** **[1]**

(a) Closed system exchanges both energy and matter with the surroundings. **[1]**

10. **Fill in the blanks:** **[1]**

(a) If the system does not undergo any spontaneous change in its internal structure due to chemical reaction, diffusion etc., then, the system is said to be in _____ equilibrium. **[1]**

11. The tile floor feels colder than the wooden floor even though both floor materials are at same temperature. Why? **[1]**

12. Explain why two bodies at different temperatures T_1 and T_2, if brought in thermal contact, do not necessarily settle to the mean temperature $(T_1 + T_2)/2$. **[1]**

13. Why is temperature gradient required for flow of heat from one body to another? **[1]**

Section B

14. What is thermodynamics? State its important characteristics. **[2]**

15. Two bodies at different temperatures T_1, and T_2 are brought in thermal contact do not necessarily settle down to the mean temperature of T_1 and T_2? **[2]**

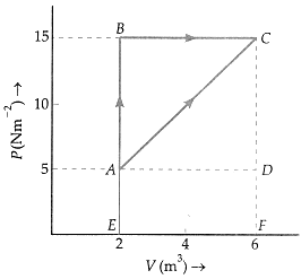
Section C

16. Two bodies at different temperatures T_1 and T_2 are brought in contact. Under what condition, they settle to mean temperature? (after they attain equilibrium) **[3]**

Section D

17. In Figure an ideal gas changes its state from state A to C by two paths ABC and AC. **[5]**

i. Find the path along which work done is the least.

ii. The internal energy of gas at A is 10 J and amount of heat supplied to change its state to C through the path AC is 200 J. Calculate the internal energy at C.

iii. The internal energy of gas at state B is 20 J. Find the amount of heat supplied to the gas to go from A to B.