CBSE

THERMODYNAMICS WS 6

Class 11 - Physics

Section A

1. Which of the following is not a thermodynamics co-ordinate? **[1]**

   a) T
   b) P
   c) R
   d) V

2. Which of the following is path dependent? **[1]**

   a) P
   b) U
   c) V
   d) P dV

3. Triple point temperature of water is: **[1]**

   a) 273.16 K
   b) 373.16 K
   c) 273 K
   d) 273.15 K

4. Which one of the following is not a state function? **[1]**

   a) entropy
   b) temperature
   c) work
   d) pressure

5. Which of the following is not a state function? **[1]**

   a) work done at constant pressure
   b) enthalpy
   c) work done by non-conservative force.
   d) work done by conservative force

6. Which is an intensive property? **[1]**

   a) weight
   b) refractive index
   c) mass
   d) volume

7. The state of a thermodynamic system is represented by: **[1]**

   a) number of moles
   b) pressure only
   c) volume only
   d) pressure, volume and temperature

8. The correct value of 0° C on the Kelvin scale is: **[1]**

   a) 273.16 K
   b) 273.2 K
   c) 273 K
   d) 273.15 K

9. **Assertion (A):** The internal energy of an isothermal process does not change. **[1]**
   Reason (R): The internal energy of a system depends only on pressure of the system.

   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.

10. **Assertion (A):** State variables are required to specify the equilibrium state of the system. **[1]**

Reason (R): Pressure is an intensive state variable.

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.

11. **Assertion:** In an isolated system, the entropy increases. **[1]**

Reason: The processes in an isolated system are adiabatic.

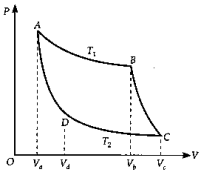
a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

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.

12. The P-V diagram shows that two adiabatic parts of the same gas intersect two isothermals at T_1 and T_2. **[1]**



How the ratios $(\frac{V_a}{V_d})$ and $(\frac{V_b}{V_c})$ are related to each other?

a) $\left(\frac{V_a}{V_d}\right) = 2\left(\frac{V_b}{V_c}\right)$

b) $\left(\frac{V_a}{V_d}\right) = \left(\frac{V_b}{V_c}\right)$

c) $\left(\frac{V_a}{V_d}\right) = \left(\frac{V_b}{V_d}\right)$

d) $\left(\frac{V_a}{V_d}\right) = \left(\frac{V_b}{V_c}\right)^2$

13. What is the specific heat of a gas in an adiabatic process? **[1]**

14. Can the temperature of an isolated system remain constant? **[1]**

15. Is equation PV = RT valid for isothermal and adiabatic processes? **[1]**

Section B

16. The compression ratio of a certain diesel engine is 15. This means that air in the cylinder is compressed to $\frac{1}{15}$ of its initial volume. If the initial pressure is 1.0×10^5 Pa and the initial temperature is 300 K find the final pressure and temperature after compression. Air is mostly a mixture of oxygen and nitrogen and γ = 1.4. **[2]**

Section C

17. **State True or False:** **[4]**

(a) In thermodynamics, heat, work and internal energy are state variables of a system. **[1]**

(b) In an isolated system, entropy may be decreased i.e., $\Delta S \leq 0$. **[1]**

(c) The extensive variables change with the size of the system, but the intensive variables do not change with size. **[1]**

(d) When a cyclic path is traced in anti-clockwise direction, net work is done by the gas. **[1]**

Section D

18. **Fill in the blanks:** **[6]**

(a) An assembly of a very large number of particles having a certain value of pressure, volume and temperature is called a _____. **[1]**

(b) _____ system exchanges neither energy nor matter with its surroundings. **[1]**

(c) _____ system exchanges only energy (not matter) with its surroundings. **[1]**

(d) The equation which represents the relationship between the state variables of a system is called its _____. **[1]**

(e) Every equilibrium state of a thermodynamic system is completely described by specific values of some macroscopic variables and these are called _____. **[1]**

(f) The processes that do not involve accelerated motion of piston-large temperature gradient and pressure gradient are _____. **[1]**