

Board – CBSE

Class – 11

Topic – Thermodynamics

### 1 marks Question:

1. What is the ratio of slopes of  $P - V$  graphs of adiabatic and isothermal process?
2. Differentiate between isothermal and adiabatic process?
3. A cannot engine develops 100 H.P and operates between  $27^\circ\text{C}$  and  $227^\circ\text{C}$ . Find
  - 1) Thermal efficiency
  - 2) Heat supplied
  - 3) Heat rejected?
4. Can a gas be liquefied at any temperature by increase of pressure alone?

### 2 marks Question

5. Two rods A and B are of equal length. Each rod has its ends at temperature  $T_1$  and  $T_2$  ( $T_1 > T_2$ ) what is the condition that will ensure equal rates of flow through the rods A and B?
6. A Sphere is at a temperature of 600 K. Its cooling rate is R in an external environment of 200K.If temperature falls to 400 K. what is the cooling rate  $R_1$  in terms of R?
7. If the temperature of the sun is doubled, the rate of energy received on each will increases by what factor?
8. Draw a  $P - V$  diagram for liquid and gas at various temperatures showing critical point ?

### 3 marks Question

9. How does second law of thermodynamics explain expansion of gas?
10. A metal rod of length 20cm and diameter 2cm is covered with a non – conducting substance. One of it ends is maintained at  $100^\circ\text{C}$  while the other is  $0^\circ\text{C}$ . It is found that 25 f of Ice melts in 5 min calculate coefficient of thermal conductivity of metal?
11. Calculate the temperature in Kelvin at which a perfectly black body radiates at the rate of  $5.67 \text{ w/cm}^2$ ?
12. If the radiation from the moon gives maxima at  $\lambda = 4700 \text{ \AA}$  and  $\lambda = 14 \times 10^{-6}\text{m}$ . What conclusion can be drawn from the above information?

## 4 marks Question

13. The tile floor feels colder than the wooden floor even though both floor materials are at same temperature. Why?

## 5 marks Question

14. A layer of ice 10cm thick is formed on a pond. The temperature of air is  $-10^{\circ}\text{C}$ . Calculate how long it will take for the thickness of ice to increase by 1mm. Density of ice =  $1\text{ g/cm}^3$ ; thermal conductivity of ice =  $0.005\text{ Cal/s/cm}^{\circ}\text{C}$ ; latent heat of ice =  $80\text{ Cal/g}$ ?
15. An indirectly heated filament is radiating maximum energy of wavelength  $2.16 \times 10^{-7}\text{m}$ . Find the net amount of heat energy lost per second per unit area. The temperature of surrounding air is  $13^{\circ}\text{C}$  given  $b = 2.88 \times 10^{-3}\text{ mL}$ ,  $\sigma = 5.77 \times 10^{-8}\text{ J/s/m}^2\text{K}^4$ ?