

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°C and 227°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°C while the other is 0°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 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°C . Calculate how long it will take for the thickness of ice to increase by 1mm. Density of ice = 1 g/cm^3 ; thermal conductivity of ice = $0.005\text{ Cal/s/cm}^{\circ}\text{C}$; latent heat of ice = 80 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°C given $b = 2.88 \times 10^{-3}\text{ mL}$, $\sigma = 5.77 \times 10^{-8}\text{ J/s/m}^2\text{K}^4$?