

Exercise for Module – 6**Answer the following questions**

1. What are required properties of a liquid used in thermometers?
2. Explain a vapor pressure thermometer.
3. How are bimetallic strips useful in thermal control systems?
4. Why is Platinum preferred in resistance type thermometers?
5. What is the resistance temperature relation for thermistors?
6. Graphically compare the resistance temperature relation of a conductor sensor and thermistor.
7. Why are thermistors preferred for temperature measurement in the lower temperature regime?
8. What are the important laws of thermocouple?
9. What are thermopiles?
10. What is the working principle of optical pyrometer?
11. Sketch an optical pyrometer.
12. How are stagnation temperature and adiabatic wall temperature related?
13. What is recovery coefficient in a temperature sensor?
14. What factors control the recovery factor?
15. What are the methods to reduce conduction errors in temperature probes?
16. Suggest ways of reducing radiation errors in temperature probes.
17. How is temperature probes calibrated?
18. Sketch a conventional total temperature probe.
19. Why are vents provided on total temperature probes?
20. Why body of some temperature probes is heated electrically?

Work out the numerical problems

1. A thermistor probe with a value of $\beta = 4200\text{K}$ when used to measure temperature in a flow shows a resistance value of 24Ω . The resistance of the thermistor at 100°C is 105Ω . If the probe has a recovery coefficient of 0.98 and if the static temperature of the flow is 218K what is the flow Mach number.
2. In an experiment to determine the temperature and the associated flow quantities, a total temperature probe of recovery factor 0.9 was used. The probe gave a temperature value of 630K . The static temperature is known to be 230K . Find the Mach number of the flow.
