Assignment
Heat and Thermodynamics
US05CPHY23

Short Questions:

1. Sate First law of thermodynamics.
2. Sate Second law of thermodynamics (Kelvin-Planck Statement).
3. Sate Second law of thermodynamics (Clausius statement).
4. Sate Third law of thermodynamics.
5. Sate First law of thermodynamics.
6. differentiate refrigerant and refrigerator.
7. What is specific heat?
8. Discuss specific heat at constant volume and constant pressure.
9. What is latent heat?
10. What is entropy?
11. Can entropy become zero?
12. What is unavailable energy?
13. Differentiate the laws of thermodynamics.
14. What are the peculiarities of laws of thermodynamics?

Long Questions?

1. What is refrigerator? Explain it and derive Clausius statement of second law of thermodynamics.
2. Prove Carnot's theorem and its corollary.
3. Why all Carnot engine operating between the same two reservoir have the same efficiency?
4. Prove that $\eta_{R1} = \eta_{R2.}$
5. Discuss in detail about Kelvin Temperature scale.
6. Prove that $T = 273.16\ ^{o}K\ (Q/Q_3)$.
7. What is absolute zero? Why it not possible to achieve?
8. Using Carnot Cycle Explain equality of ideal gas temperature and Kelvin temperature.
9. What is Clausius theorem? What is its important conclusion?
10. Derive $\oint_R \frac{dQ}{T} = 0$.

11. Explain mathematical formulation of the second law of thermodynamics.
12. Prove that $\frac{dQ}{T} = dS$.
13. For ideal gas, derive the value of entropy at constant pressure.
14. For ideal gas, derive the value of entropy at constant volume.
15. Prove $S = C_p \ln T - nR \ln P + S_0$.
16. Prove $S = C_V \ln T - nR \ln V + S_0$.
17. What is T-S diagram? Explain it.
18. Shows that during a reversible adiabatic process, the entropy of a system remains constant.
19. What are isentropic process? Discuss it in detail.
20. Explain Entropy and reversibility.
21. Shows that when a reversible process is performed, the entropy of univers remains unchanged.
22. What is Entropy and irreversibility?
23. Discuss Processes Exhibiting External Mechanical Irreversibility.
24. Discuss Process exhibiting internal mechanical irreversibility.
25. Discuss Processes Exhibiting External Thermal Irreversibility.
26. Discuss Processes Exhibiting Chemical Irreversibility.
27. Discuss theory of Entropy and nonequilibrium states.
28. What is principle of the increase of entropy? Discuss in detail.
29. What is application of entropy principle?
30. What is unavailable energy? Discuss entropy and unavailability of energy.
31. Prove that the energy that becomes unavailable for work during an irreversible process is T0 times the entropy change of the universe.
32. Explain Entropy and disorder.
33. Derive Clapeyron's First order transition equation.
34. Derive Clapeyron's Second order transition equation.
35. What is difference between first order and second order Clapeyron's equations?