

BHARATA MATA COLLEGE, THRIKKAKARA

MODEL EXAMINATION JANUARY 2020

B.Sc. Physics model II, Semester- VI

Thermal and Statistical Physics

TIME: 3 Hrs

Max. Marks: 60

Section A

Answer any 10 Questions

Each question carries 1mark

1. What do you mean by critical state?
2. Why C_p is greater than C_v ?
3. Distinguish between ideal gas and real gas?
4. Define compressibility?
5. What is a cyclic process?
6. State second law of thermodynamics.
7. What is meant by efficiency of a heat engine?
8. Write the partition function of canonical ensemble
9. Define statistical equilibrium.
10. What do you mean by Fermi Dirac statistics?
11. Define a Phase Space.
12. State equipartition theorem.

(10 X1 = 10)

Section B

Answer any 6 Questions

Each question carries 5 marks

13. Briefly explain Andrews experiment on CO_2 ?
14. State and explain Carnot's theorem.
15. Derive an expression for work done in an adiabatic expansion of an ideal gas?
16. A Carnot engine absorbs 10^3 KJ of heat from a reservoir at 500K and rejects heat to a reservoir at 300K. Determine its efficiency and heat rejected to the colder reservoir.
17. Derive Clausius-Clapeyron latent heat equation.
18. Briefly discuss the Maxwell Boltzmann distribution.
19. Write a short note on ensembles
20. Calculate the number of different arrangements of eight indistinguishable particles among six cells of equal a priori probability, there being no restriction on the number of particles that can go into a cell.
21. Derive an expression for grand canonical partition function.

(5X6 = 30)

Section C
Answer any 2 Question
Each question carries 10 marks

22. Briefly explain the working of Carnot's heat engine ?
23. Derive van der Waals equation of state and hence the critical constants.
24. Explain heat capacity? Derive energy equation and difference of specific heat capacities.
25. Discuss Bose Einstein statistics.

(10X2=20)
