PHYSICS - II
II Year

UNIT - I
1. Kinetic Theory of Gases

1. State the postulates of kinetic, theory of gases?
2. What is mean free path?
3. Explain briefly the Maxwell's distribution of molecular speed?
4. Derive the expressions for viscosity and thermal conductivity of a gas. Obtain the relation, between these two.

2. Thermodynamics

5. What are reversible and irreversible process.
6. What is carnot's reversible engine. Derive the expression for efficiency of the engine.
7. What is carnot's theorem.
8. What are the first and second law of thermodynamics.
9. Write a short notes on entropy and disorder?
10. What is entropy – temp diagram?

3. Thermodynamic potentials and Maxwell's equations

11. Define the four thermodynamic potentials obtain Maxwell's thermodynamic equations using these potentials.
12. What is joule kelvin effect? Explain the joule kelvin effect from Maxwell's thermodynamic relations.
13. What is clausius – clapeyron's equation?
14. Explain two specif heats of a gas obtain an expression for the difference between two specific heats?

UNIT - II
4. Low Temperature physics

15. What is joule-kelvin effect? Obtain the expression for codling produced when a gas snuffer's J-K effect?

16. Explain the principle of cooling by adiabatic demagnetization?

17. Explain briefly the principle and working of a refrigerator?

18. What is effect of chloro-fluro carbon's on ozone?

5. Quantum theory of radiations

19. What is pyrometer? Describe the construction and working of a total radiation pyrometer?

20. What is planck's hypothesis? Derive planck's formula for the distribution of energy in black body radiation. Show that wein's and Rayleigh – jeans are the special cases of planck's law?

21. Define solar constant?

22. What is the temp of sun?

6. Statistical Mechanics

23. Explain the meanings of the terms 'phase space' and 'phase cells'?

24. What are the differences b/w three statistical distributions?

25. State Fermi- Dirac distribution law. Give its mathematical expression?

UNIT - III

7. The matrix methods in parallel optics

26. Obtain the system matrix for a thick lens and hence obtain the formula for a thin lens.

27. Obtain the expression for the focal length of combination of two thin lenses separated by a distance.

28. Describe the various cardinal point in a lens system?

29. What is system Matrix?

30. What are cardinal point?

8. Aberrations

31. What is chromatic aberration? Obtain an expression for the chromatic aberration of lens. Derive the condition for achromatic when two lenses are in contact?

32. Write a short note on coma?

33. What a short note on Astigmatism?

34. What is spherical aberration? Deduce an expression for the magnitude of spherical aberration. Explain minimizing steps?

9. Interference of Light

35. Describe Fresnel's biprism method of producing interference fringes and determining the wavelength of light.

36. Describe the principle and applications of non-reflecting films?

37. Explain the formation of colours in thin film?

38. Describe Newton's ring method for measuring the wavelength of monochromatic light. Give the necessary theory?

39. Describe the principle, construction and working of a Michelson's interferometer?

40. Determine the thickness of a thin sheet of transparent material?

41. What is a Wedge – Shaped film? Describe the fringer observed in Wedge-shaped method?

10. Diffraction

42. Explain what is meant by diffraction of light. Distinguish between the fraunhofer and Fresnel's classes of diffraction?

43. Discuss two types of diffraction?

44. Discuss the fraunhofe diffraction due to a single slit.

45. What is zone plate. How is it constructed? Show that a zone plate has multiple foci. Compare the zone plate with a convex lens?

11. Polarization

46. What is Brewster's law.

47. Write a short note on the 'law of Malus'?

48. How do you distinguish b/w a quantum wave and half wave plate?

49. Describe the construction and working of Nicol prism.

50. What is optical activity? Describe how specific rotation of sugar solution is determined experimentally?

51. What is meant by polarized light?

52. Write a short note on Haygen's theory of double refracted?

12. Lasers tibre options, Holography

53. What is laser principle?
54. State some applications of lasers.
55. What is the principle of optical Fiber?
56. Describe step index, graded index fiber?
57. Describe the basic principle of holography?
58. Applications of laser, fiber, opties, holography?
59. What are the Einsten coefficients. Give the relationship b/w them?
60. Describe the working and construction of He-Ne laser?
61. Describe the construction and working of Ruby laser?

Problems:

62. Kinetic theory of Gases.
63. Thermodynamics (Based on carnot's cycle efficiency).
64. Quantum theory of radiations (Based on solar constant, Wien's displacer)
65. Aberrations.
66. Interference (Based on fringe width).
67. Polarization (Specific rotation, molus, Brewster's law).