

DR.B.R.AMBEDKAR OPEN UNIVERSITY

M.Sc First Year Semester-II PHYSICS (2025-2026)

Course -01: STATISTICAL MECHANICS

ASSIGNMENT-I

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

I. Answer **all** the following questions.

II. Each question carries **5** marks.

1. Explain in details about Liouville's theorem?
2. Distinguish in detail between the three types of ensembles.
3. Discuss in detail about degenerate electron gas equation of state?

ASSIGNMENT-II

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

I. Answer **all** the following questions.

II. Each question carries **5** marks.

1. Give the concepts of Postulates of equal a priori probability?
2. State the Grand Canonical Ensemble?
3. Discuss the Bragg- Williams Approximation one dimensional using model?

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Course -02: ELECTROMAGNETIC THEORY

ASSIGNMENT-I

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

I. Answer **all** the following questions.

II. Each question carries **5** marks.

1. Explain Coulomb's Law of electrostatics and provide its mathematical derivation the Force between two charges?
2. Explain Poynting's Theorem and derive its full mathematical expression?
3. Derive the general wave equation for a uniform plane wave propagating in a conductive medium.

ASSIGNMENT-II

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

I. Answer **all** the following questions.

II. Each question carries **5** marks.

1. Derive the boundary conditions for electric and magnetic fields at the interface between two dielectric media.
2. Using Lienard-Wiechert potentials, derive and describe the fields for a charge in arbitrary motion.
3. Explain the Debye theory of screening and its implications for plasma behavior.

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Course -03: ADVANCED QUANTUM MECHANICS

ASSIGNMENT-I

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

I. Answer **all** the following questions.

II. Each question carries **5** marks.

4. What is the physical significance of the Schrodinger equations?
5. Explain the properties of Pauli Spin matrices?
6. Discuss criteria for the validity of born approximation and explain form factor?

ASSIGNMENT-II

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

I. Answer **all** the following questions.

II. Each question carries **5** marks.

1. State and explain Fermi's Golden rule?
2. Derive the relationship between the differential cross section and scattering amplitude?
3. Obtain Dirac's equation in the presence of electromagnetic field.

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Course - 04: CONDENSED MATTER PHYSICS

ASSIGNMENT-I

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

I. Answer **all** the following questions.

II. Each question carries **5** marks.

1. Distinguish between amorphous solids and glasses. Give the various definitions of glasses.
2. Describe Bragg's Law in detail.
3. Discuss about Burger's vector and Burger's circuit with a neat sketch.

ASSIGNMENT-II

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

I. Answer **all** the following questions.

II. Each question carries **5** marks.

1. Explain the Drude model of free electron theory of metals. What are the gains and draw backs of this model?.
2. State and prove Bloch theorem. Explain the properties of Bloch functions
3. Discuss the Einstein's theory of specific heats.
