

DR.B.R.Ambedkar Open University

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

SEMESTER-I

Course - I: Mathematical 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. Find the series solution of the Bessel differential equation of order n ?
2. Write the properties of Laplace transformation.
3. State and write the uses of Cayley -Hamilton theorem

ASSIGNMENT-II

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

III. Answer **all** the following questions.

IV. Each question carries **5** marks.

1. Find the Inverse Laplace transform using convolution i) $\frac{1}{s^2(s^2 + w^2)}$,ii) $\frac{1}{s^2(s^2 - w^2)}$
2. State and prove initial value theorem and final value theorem.
3. Find an expression for the divergence of a vector.

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SEMESTER-I

Course - II: Classical 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 Deduce the conservation laws for linear and angular momentum.
- 2 Derive Lagrange's equation from Hamilton's principle.
- 3 Discuss the canonical transformations in detail and explain the condition for a Transformation to be canonical.

ASSIGNMENT-II

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

III. Answer **all** the following questions.

IV. Each question carries **5** marks.

1. Derive the Euler-Lagrange equations from the principle of least action and explain their physical interpretation.
2. Define inertia tensor? Deduce the inertia tensor matrix for a rigid rotating body.
3. Deduce Lagrange's equations of motion of one dimensional harmonic oscillator

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SEMESTER-I

Course - III: 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.

1. Discuss postulates of Quantum Mechanics?
2. Explain Dirac's Ket and Bra Notation and mention its properties
3. State and derive uncertainty principle for the position and momentum

ASSIGNMENT-II

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

III. Answer **all** the following questions.

IV. Each question carries **5** marks.

1. Explain tunnelling effect and discuss how this explains alpha emission.
2. State Schrodinger and Heisenberg pictures and obtain the equation of motion for interaction Picture.
3. Describe the time dependent Schrodinger equation

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SEMESTER-I

Course - IV: Electronics

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 construction and working of Photo diode.
2. Explain the role of a Zener diode in a Zener diode voltage regulator.
3. Discuss the Wien-Bridge Oscillator.

ASSIGNMENT-II

Maximum Marks: 15

Minimum marks: 06

Instructions to the Candidates:

III. Answer **all** the following questions.

IV. Each question carries **5** marks.

1. Draw the neat circuit diagram of Astable Multivibrator using transistor and derive its frequency with the help of waveform diagram.
2. Explain about the i) Offsets Currents, ii) Common Mode Rejection Ratio, iii) Slew rate.
3. Explain the working of square wave generator with neat circuit diagram?
