

DR.B.R.Ambedkar Open University

M.Sc 1year - PHYSICS (2018-19)

Course -1: Mathematical Physics and Classical Mechanics

FIRST ASSIGNMENT

Maximum Marks: 15

Minimum marks: 06

Section-A (Essay Type) 1×10

Answer any **one** of the following questions in about 30 lines

1. Find the solution of the Laplace's equation in Cartesian coordinate system.
2. Explain the difference between the inner product of two tensors and the contraction of a tensor

Section-B (Short answer type)-----1×5

Answer any **one** of the following questions in about 10 lines.

1. Write the theorem of Generating Function of Hermite polynomials.
2. Where can you use convolution theorem in Laplace Transform

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Course -1: Mathematical Physics and Classical Mechanics

SECOND ASSIGNMENT

Maximum Marks: 15

Minimum marks: 06

Section-A (Essay Type)-----1×10

Answer any **one** of the following questions in about 30 lines

1. Derive Lagrange's equation of motion using D'Alembert's principle for conservative holonomic system
2. Derive Newton's formula for forward interpolation and explain the assumptions for its validity.

Section- B (Short answer type)-----1×5

Answer any **one** of the following questions in about 10 lines.

1. Explain the principle of virtual work.
2. Explain the technique involved in numerical integration

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Course -II: Statistical Mechanics and Quantum Mechanics

FIRST ASSIGNMENT

Maximum Marks: 15

Minimum marks: 06

Section-A (Essay Type)-----1×10

Answer any **one** of the following questions in about 30 lines.

1. Explain the three ensembles in the quantum statistical mechanics.
2. Define and explain the B-E statistics and arrive at the distribution function.

Section-B (Short answer type)-----1×5

Answer any **one** of the following questions in about 10 lines.

1. State and explain Liouville's theorem
2. Explain eigen functions and eigen vectors

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Course -II: Statistical Mechanics and Quantum Mechanics

SECOND ASSIGNMENT

Maximum Marks: 15

Minimum marks: 06

Section-A (Essay Type)-----1×10

Answer any **one** of the following questions in about 30 lines.

1. Formulate the schrodinger equation for Hydrozen atom and separate the angular and radial parts.
2. Explain the stark effect in Hydrozen atom

Section-B (Short answer type)-----1×5

Answer any **one** of the following questions in about 10 lines.

1. State and Prove the Uncertainty Principle.
2. Derive Pauli's spin matrices.

Course -III: Solid State Physics

FIRST ASSIGNMENT

Maximum Marks: 15

Minimum marks: 06

Section-A (Essay Type)-----1×10

Answer any **one** of the following questions in about 30 lines.

1. Distinguish between crystalline and non crystalline solids. Explain the glass characterizing properties.
2. Discuss the Sommer field quantum theory and explain the behaviour of free electrons in a three dimensional potential box

Section-B (Short answer type)-----1×5

Answer any **one** of the following questions in about 10 lines.

1. What factors determine the intensity of reflections in powder method?
2. Explain how the effective mass of an electron varies with wave vector.

Course -III: Solid State Physics

SECOND ASSIGNMENT

Maximum Marks: 15

Minimum marks: 06

Section-A (Essay Type)-----1×10

Answer any **one** of the following questions in about 30 lines.

1. Explain the Debye's theory of specific heats. What are its successes and failures?
2. Discuss the thermodynamic phenomenological theory of ferroelectricity.

Section-B (Short answer type)-----1×5

Answer any **one** of the following questions in about 10 lines.

1. Give the experimental method for verification of dispersion curve
2. Explain Curie Weiss law for paramagnetic materials

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Course -IV: Semiconductor Devices: Analog and Digital Electronics

FIRST ASSIGNMENT

Maximum Marks: 15

Minimum marks: 06

Section-A (Essay Type)-----1×10

Answer any **one** of the following questions in about 30 lines

1. Draw a neat diagram of RC coupled amplifier and explain its operation
2. Explain the Open loop and closed loop gains of an Op-Amp

Section-B (Short answer type)-----1×5

Answer any **one** of the following questions in about 10 lines.

1. How Zener diode is used as a regulator. Explain
2. How the Op-Amp is used as a Differentiator?

Course -IV: Semiconductor Devices: Analog and Digital Electronics

SECOND ASSIGNMENT

Maximum Marks: 15

Minimum marks: 06

Section-A (Essay Type)-----1×10

Answer any **one** of the following questions in about 30 lines

1. How does flash A/D converter Operate. Explain.
2. Explain the operation of RS and JK flip flops along with their truth tables.

Section-B (Short answer type)-----1×5

Answer any **one** of the following questions in about 10 lines.

1. Draw the circuit diagram of all logic gates and explain the action of each gate along with its truth table.
2. Explain the working of a 4 to 1 MUX