



TAMIL NADU OPEN UNIVERSITY

Chennai - 15
School of Science

Programme Code No	: 281
Programme Name	: M.Sc., Physics
Course Code & Name	: MPHY-11: CLASSICAL AND STATISTICAL MECHANICS
Batch	: AY 2019-20
No.of Assignment	: One Assignment for Each 2 Credits
Maximum CIA Marks	: 25 (Average of Total No. of Assignments)

ASSIGNMENT -I

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Discuss Euler's angles as the generalized coordinates for a rigid body motion. Obtain an expression for the angular velocity in terms of Euler's angles.
2. Obtain Euler's equation of motion for a rotating rigid body.
3. Explain in detail various generating functions and the related transformation equations.

ASSIGNMENT -II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Consider two identical plane pendulums that are joined by a massless spring. The pendulum's position is specified by the angles θ_1 and θ_2 . The natural length of the spring is equal to the distance between the two supports, so the equilibrium position is at $\theta_1 = \theta_2 = 0$ with the two pendulums vertical. Write down the total kinetic energy and the gravitational and spring potential energies. Write down the Lagrange equations of motion. Find and describe the normal modes for these two coupled pendulums.
2. For small oscillations we write potential energy V as a quadratic function of displacements and neglect the linear and higher order terms. Explain why.
3. Two identical harmonic oscillators having mass M and force constants k each are coupled by means of a spring of force constant k . Find the eigen frequencies corresponding to the symmetric and antisymmetric modes of vibration. Also calculate the eigenvectors and the normal coordinates.

ASSIGNMENT -III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Derive an expression for equation of state of an ideal Fermi gas
2. Explain in detail in Bose-Einstein condensation and its critical conditions.
3. Explain Bose-Einstein condensation in ultracold atomic gases

1. Date of Publication : 07.01.2020
2. Last date of submission of answer script by the student to the study centre /LSC : 05.04.2020
3. Last date of submission of marks by the examiner to the study centre/LSC : 12.04.2020
4. Last date of submission of marks by the study centre/LSCs to the office of C.O.E. on or before 25.04.2020



TAMIL NADU OPEN UNIVERSITY

Chennai - 15
School of Science

Programme Code No : 281
Programme Name : M.Sc., Physics
Course Code & Name : MPHY-12:MATHEMATICAL PHYSICS
Batch : AY 2019-20
No.of Assignment : One Assignment for Each 2 Credits
Maximum CIA Marks : 25 (Average of Total No. of Assignments)

ASSIGNMENT - I

Marks- 25

Answer any one of the question not exceeding 1000 words

1. State and verify Cayley – Hamilton Theorem
2. Derive Legendre function.
3. Find solution for the following equation $d^2y/dx^2 - 2x dy/dx + 2ny = 0$ Where n is positive integer.

ASSIGNMENT - II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Explain the following
 - (i) Derivative of Fourier Transform, (ii) Fourier transform of a Derivative, (iii) Fourier sine and cosine Transform of Derivatives (iv) Find the Fourier transform of e^{-lt}
2. What is Laplace Transform? Explain first and second shifting theorem & Laplace Transform of derivatives.
3. What is Inverse Laplace Transform? Explain with example.

ASSIGNMENT - III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. State and verify Cauchy's integral theorem and Cauchy's integral formula.
2. Which of the following are analytic functions of complex variable, $z = x+iy$ (i) Z (ii) Z^{-1} (iii) $e^{\sin z}$
3. How to Representation of a group and explain Reducible and irreducible representation with example

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TAMIL NADU OPEN UNIVERSITY

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Programme Code No : 281
Programme Name : M.Sc., Physics
Course Code & Name : MPHY-13:ELECTROMAGNETIC THEORY
Batch : AY 2019-20
No.of Assignment : One Assignment for Each 2 Credits
Maximum CIA Marks : 25 (Average of Total No. of Assignments)

ASSIGNMENT - I

Marks- 25

Answer any one of the question not exceeding 1000 words

1. State and explain Gauss law and its applications
2. State and prove Electrostatics Uniqueness Theorems.
3. Explain Magnetic force due to Volume distribution of current and derive Continuity equation

ASSIGNMENT -II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Derive Boundary conditions on the field vectors
2. Derive Maxwell's equations and their physical significance
3. State and prove work-energy theorem and derive its integral form

ASSIGNMENT -III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Derive Boundary Conditions For The Electromagnetic Field Vectors: B, E, D, And H,(At The Interface Between Two Media)
2. Explain General Treatment of Reflection and Refraction
3. Define reflection coefficient and derive the relation of Transmission coefficient between two nonconducting media.

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TAMIL NADU OPEN UNIVERSITY

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Programme Code No	: 281
Programme Name	: M.Sc., Physics
Course Code & Name	: MPHY-14:NUCLEAR PHYSICS
Batch	: AY 2019-20
No.of Assignment	: One Assignment for Each 2 Credits
Maximum CIA Marks	: 25 (Average of Total No. of Assignments)

ASSIGNMENT -I

Marks- 25

Answer any one of the question not exceeding 1000 words

1. (a) How are the nuclear spin, orbital Angular momentum and parity of nucleus predicted from the shell model. (b) Explain collective model of Nucleus.
2. Discuss different types of exchange forces.
3. (a) What are magic and semi-magic numbers? Give experimental evidences in support of magic numbers and shell structure of nucleons in nuclei. (b) Write a note on Nuclear Isomerism.

ASSIGNMENT -II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. (i) Derive Fermi's theory of β -decay? (ii) Write a note on β -ray spectrum?.
2. List out the properties of α , β , γ rays
3. State and explain Radioactive displacement law and Selection rules for β -decay

ASSIGNMENT -III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Derive Breit - Wigner Single level formula for scattering
2. Explain the following (i) Neutron -Proton scattering at low energies (ii) Proton - Proton scattering at low energies.
3. What you mean by an elementary particle? How are the elementary particles Classified on the basis of their masses, interaction.

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TAMIL NADU OPEN UNIVERSITY

Chennai - 15
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Programme Code No	: 281
Programme Name	: M.Sc., Physics
Course Code & Name	: MPHY-15:ELECTRONICS
Batch	: AY 2019-20
No.of Assignment	: One Assignment for Each 2 Credits
Maximum CIA Marks	: 25 (Average of Total No. of Assignments)

ASSIGNMENT - I

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Explain QUNE. MCCLUSKEY METHOD with example.
2. What is Multiplexer and DeMultiplexer. Explain with example.
3. Explain full subtractor, Parallel Binary subtractor and Serial Binary suntractor

ASSIGNMENT -II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Explain the construction and working of JK Master flip-flop
2. Explain the term shift register and its types in detail.
3. What is Counters? Explain its types.

ASSIGNMENT -III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Explain in detail of A/D converter
2. Explain EPROM floating gate transistor characteristic theory.
3. Explain D/A converter Architecture

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