



TAMIL NADU OPEN UNIVERSITY
Chennai - 15
School of Sciences
Department of Physics

HOME / SPOT ASSIGNMENT

Programme Code No	: 281
Programme Name	: M. S.c., Physics
Course Code & Name	: MPHY-11, Classical and Statistical Mechanics
Batch	: AY 2018 -19, AY2019-20 – I Year
No.of Assignments	: One Assignment for Each 2 Credits
Maximum CIA marks	: 25 (Average of Total No. of Assignment)

ASSIGNMENT -I

Answer any one of the questions not exceeding 1000 words

1. Discuss the problem of one dimensional harmonic oscillator by the Hamilton Jacobi method.
2. Evaluate the J_q integral in the Kepler problem by the method of complex contour integration.
3. 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.

ASSIGNMENT -II

Answer any one of the questions not exceeding 1000 words

1. A thin rod of length $2b$ and mass m is suspended by its two ends with two identical vertical springs with force constant k that are attached to the horizontal ceiling. Assuming that the whole system is constrained to move in just one vertical plane, find the normal frequencies and normal modes of small oscillations. Describe and explain the normal modes.
2. A mass particle moves in a constant vertical gravitational field along the curve defined by $y=ax^4$, where y is the vertical direction. Find the equation of motion for small oscillations about the position of equilibrium.
3. A uniform horizontal rectangular plate rests on four similar springs at the corners. Investigate the small oscillations for which the plate remains rigid.

ASSIGNMENT -III

Answer any one of the questions not exceeding 1000 words

1. Derive an expression for equation of motion for density matrix.
2. Derive an expression for *Fermi-Dirac distribution law*.
3. Explain Bose - Einstein condensation in ultracold atomic gases



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Programme Code No	: 281
Programme Name	: M. S.c., Physics
Course Code & Name	: MPHY-12, Mathematical Physics
Batch	: AY 2018-19, AY 2019-20 - I Year
No.of Assignments	: One Assignment for Each 2 Credits
Maximum CIA marks	: 25 (Average of Total No. of Assignment)

ASSIGNMENT -I

Answer any one of the questions not exceeding 1000 words

1. Explain Beta function and evaluate it.
2. Derive Bessel Function.
3. State and verify Cayley - Hamilton Theorem

ASSIGNMENT -II

Answer any one of the questions not exceeding 1000 words

1. Find the Fourier transform of the slit function $f(x)$ defined as

$$f(x) = \begin{cases} \frac{1}{\epsilon}, & |x| \leq \epsilon \\ 0, & |x| > \epsilon \end{cases}$$

Determine the limit of this transform as $\epsilon \rightarrow 0$ and discuss the result.

2. Derivative Problems: Evaluate the following using Laplace Transform of derivatives

$$(i) \mathcal{L}\{1\} = \frac{1}{s} \quad (ii) \mathcal{L}\{t\} = \frac{1}{s^2} \quad \text{and} \quad (iii) \mathcal{L}\{e^{at}\} = \frac{1}{s-a}$$

3. What is Laplace Transform? Explain first and second shifting theorem & Laplace Transform of derivatives.

ASSIGNMENT -III

Answer any one of the questions not exceeding 1000 words

1. State and verify Cauchy's integral theorem and Cauchy's integral formula.
2. Explain the properties of modulus with example and Derive Cauchy-Riemann Conditions
3. What is group? How to Representation of a group and explain Reducible and irreducible representation with example



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Programme Code No	: 281
Programme Name	: M. S.c., Physics
Course Code & Name	: MPHY-13, Electromagnetic Theory
Batch	: AY 2018-19, AY 2019-20 – I Year
No.of Assignments	: One Assignment for Each 2 Credits
Maximum CIA marks	: 25 (Average of Total No. of Assignment)

ASSIGNMENT -I

Answer any one of the questions not exceeding 1000 words

1. Derive Poisson's and Laplace equation and Derive an expression for Energy associated to an electrostatic field.
2. State and prove Electrostatics Uniqueness Theorems.
3. Explain Magnetic force due to Volume distribution of current and derive Continuity equation

ASSIGNMENT -II

Answer any one of the questions not exceeding 1000 words

1. Derive Maxwell's equations and their physical significance
2. State and prove work-energy theorem and derive its integral form
3. (i) What is "wave impedance" of free space and derive the expression for the same.
(ii) What is "skin depth" and derive the expression for the same

ASSIGNMENT -III

Answer any one of the questions not exceeding 1000 words

1. Derive an expression for Force on a point charge embedded in a dielectric and Derive the **Fresnel's Equations**
2. Derive an equation for rectangular wave guide and Explain total internal reflection and critical angle
3. Define reflection coefficient and derive the relation of Transmission coefficient between two nonconducting media.



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Programme Code No	: 281
Programme Name	: M. S.c., Physics
Course Code & Name	: MPHY-14, Nuclear Physics
Batch	: AY 2018-19, AY 2019-20 – I Year
No.of Assignments	One Assignment for Each 2 Credits
Maximum CIA marks	: 25 (Average of Total No. of Assignment)

ASSIGNMENT -I

Answer any one of the questions not exceeding 1000 words

1. With a neat diagram explain Bainbridge and Jordan mass spectrograph
2. Discuss different theories of Nuclear composition. What is Tensor force?
3. Explain the salient features of the liquid drop model and give the various assumptions made and Derive Bohr-Wheeler theory of Nuclear

ASSIGNMENT -II

Answer any one of the questions not exceeding 1000 words

1. Derive Gamow's theory of α -decay and What is meant by Fine structure of α -rays?
2. State and explain Geiger -Nuttal law? and What is Internal conversion in γ - decay? And Explain DuMond Bent crystal spectrometer for the determination of γ -ray energies? With necessary diagram.
3. (i) Derive Fermi's theory of β -decay? (ii) Write a note on β -ray spectrum?. List out the properties of α , β γ rays

ASSIGNMENT -III

Answer any one of the questions not exceeding 1000 words

1. Explain Meson theory of nuclear force and Derive Breit - Wigner Single level formula for scattering
2. Give the charge and quantum number associated with each quark. How do the quarks combine to form baryons and mesons?
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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Programme Code No	: 281
Programme Name	: M. S.c., Physics
Course Code & Name	: MPHY-15, Electronics
Batch	: AY 2018-19, AY 2019-20 – I Year
No.of Assignments	: One Assignment for Each 2 Credits
Maximum CIA marks	: 25 (Average of Total No. of Assignment)

ASSIGNMENT -I

Answer any one of the questions not exceeding 1000 words

1. Explain the construction of TWO variable K-Map with example and What are universal gates. Explain with NAND and NOR.
2. What is full Adder?. Explain full adder using AND - OR
3. Explain Decoder and Encoder with circuit diagram and truth table.

ASSIGNMENT -II

Answer any one of the questions not exceeding 1000 words

1. Explain the construction and working of JK Master flip-flop
2. Draw and explain Block diagram of 4 bit Universal shift register.
3. What is Counters? Explain its types.

ASSIGNMENT -III

Answer any one of the questions not exceeding 1000 words

1. Explain the construction and working of Astable multivibrator.
2. Explain D/A converter Architecture
3. Explain various types of ROM and RAM and Explain the term Flash memory and charge coupled device (CCD)