

(DPHY01)

ASSIGNMENT-1

M.Sc. (Previous) DEGREE EXAMINATION, DEC. – 2017

First Year

PHYSICS

Mathematical Physics

MAXIMUM MARKS:30

Answer ALL Questions

Q1) Obtain the series solution of Legendre polynomial.

Q2) a) From generating function show that $H_{n-1}(x) + H_{n+1}(x) = \frac{2n}{x} H_n(x)$.

b) Evaluate the value of $J_{\pm\frac{3}{2}}(x)$ and $J_{\pm\frac{5}{2}}(x)$.

Q3) a) Prove that $u = e^{-x}(x \sin y - y \cos y)$ is harmonic.

b) Explain Cauchy's integral theorem.

Q4) a) Explain Morera's theorem.

b) State and prove Laurent's theorem.

Q5) a) Mention different types of tensors.

b) Prove that Kronecker delta is a mixed tensor

(DPHY01)

ASSIGNMENT-2
M.Sc. (Previous) DEGREE EXAMINATION, DEC. – 2017

First Year

PHYSICS

Mathematical Physics

MAXIMUM MARKS:30

Answer ALL Questions

- Q1)** a) Explain Quotient law of tensor.
b) Explain the Laplacian operator in Riemann space.
- Q2)** a) Explain partial fraction method for inverse LT.
b) Find the LT of
i) $t^2 + at + b$ and
ii) $\sinh^2 2t$
- Q3)** a) Find the fourier series for $f(x)$ in the interval $(-\pi, \pi)$ where
 $f(x) = \pi + x, -\pi < x < 0$
 $= \pi - x, 0 < x < \pi$
b) Explain FT of delta function.
- Q4)** Write notes on any two of the following
a) Prove $L_{n+1}(x) = (2n + 1 - x)L_n(x) - nL_{n-1}(x)$
b) Jordon's inequality
c) Christoffel's symbols
d) LT of derivative



(DPHY02)

ASSIGNMENT-1

M.Sc. (Previous) DEGREE EXAMINATION, DEC. – 2017

First Year

PHYSICS

Classical Mechanics and Statistical Mechanics

MAXIMUM MARKS:30

Answer ALL Questions

- Q1)** a) Explain the principle of virtual work.
b) State and explain D'Alembert's principle.
- Q2)** a) Obtain the Lagrange's equation from Hamilton's principle.
b) Explain the principle of least action.
- Q3)** a) What are canonical transformations? Give condition for a transformation to be canonical.
b) Obtain canonical equations of motion in Poisson bracket notation.
- Q4)** a) Explain Hamilton – Jacobi theory.
b) Discuss the free – vibration of a linear triatomic molecule.
- Q5)** a) State and explain equipartition theorem.
b) What is Gibb's paradox? Explain.

(DPHY02)

ASSIGNMENT-2

M.Sc. (Previous) DEGREE EXAMINATION, DEC. – 2017

First Year

PHYSICS

Classical Mechanics and Statistical Mechanics

MAXIMUM MARKS:30

Answer ALL Questions

- Q1)** a) Define an ensemble and distinguish canonical and grand canonical ensembles.
b) Explain the density fluctuations in the grand canonical ensemble.
- Q2)** a) Explain the significance of partition function in quantum statistical mechanics.
b) Explain variational principle.
- Q3)** a) Explain the Theory of White dwarf.
b) Explain Bose – Einstein condensation.
- Q4)** Write notes on any Two of the following
- a) Cyclic coordinates
 - b) Action – angle variables
 - c) Postulates of quantum statistical mechanics
 - d) Darwin – Fowler method



(DPHY03)

ASSIGNMENT-1

M.Sc. (Previous) DEGREE EXAMINATION, DEC. – 2017

First Year

PHYSICS

Quantum Mechanics

MAXIMUM MARKS:30

Answer ALL Questions

- Q1)** a) Explain the difference between classical mechanics and quantum mechanics.
b) What is wave function? Explain its physical interpretation.
- Q2)** Obtain the solution of wave equation for a particle moving in three dimensions in a constant potential field with finite walls.
- Q3)** a) Briefly explain the time independent perturbation theory for non – degenerate systems.
b) Explain the variation method.
- Q4)** a) Write a note on sudden and adiabatic approximation.
b) Briefly explain Generalized perturbation theory.
- Q5)** a) Obtain the commutation relations of L , L_x , L^2 and L_z .
b) Explain Pauli spin matrices.

(DPHY03)

ASSIGNMENT-2

M.Sc. (Previous) DEGREE EXAMINATION, DEC. – 2017

First Year

PHYSICS

Quantum Mechanics

MAXIMUM MARKS:30

Answer ALL Questions

- Q1)** a) What are CG coefficients? Explain.
b) Distinguish between Schrodinger's and Heisenberg's pictures.
- Q2)** a) Obtain the free particle solution by Dirac matrices.
b) Write a note on probability and current densities.
- Q3)** a) Uncertainty principle
b) Stark effect in hydrogen atom
c) Wigner – Eckail Theorem
d) Negative energy states.



(DPHY04)

ASSIGNMENT-1

M.Sc. (Previous) DEGREE EXAMINATION, DEC. – 2017

First Year

PHYSICS

Electronics

MAXIMUM MARKS:30

Answer ALL Questions

- Q1)** a) Explain how op.amp can be used as inverting amplifier.
b) What is feedback? Explain the effect of feed back on closed loop gain.
- Q2)** a) Explain the principle and working of phase shift oscillator with circuit diagram.
b) Discuss the generation of square wave by using 555 times.
- Q3)** a) Explain the propagation of TM and TR waves in the rectangular guides.
b) Write a note on magic T attenuators.
- Q4)** a) Explain the working of Faster Seeley discrimination.
b) Explain about ground wave and space wave propagation.
- Q5)** a) State and prove demorgan Theorems.
b) Define NAND, NOR and Exclusive OR gates and give their truth tables.

(DPHY04)

ASSIGNMENT-2

M.Sc. (Previous) DEGREE EXAMINATION, DEC. – 2017

First Year

PHYSICS

Electronics

MAXIMUM MARKS:30

Answer ALL Questions

- Q1)** a) Draw a master slave flip – flop and explain its operation.
b) Distinguish between synchronous and asynchronous counters.
- Q2)** a) Explain the architecture of 8085.
b) Write an assembly language program to add two, 8 bit numbers.
- Q3)** a) Explain the addressing modes of 8086 with examples.
b) What is an instruction cycle? Explain how these cycles are calculated in execution.
- Q4)** a) Weinbridge oscillator
b) Magnetron
c) D flip flops
d) Sample and hold circuit

