TAMIL NADU OPEN UNIVERSITY
Chennai - 15
School of Science

Programme Code No   : 281
Programme Name   : M.Sc., Physics
Course Code & Name   : MPHY-21: QUANTUM MECHANICS
Batch   : AY 2018-2019
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. Write down the matrices for the ladder operators a,a+ of the harmonic oscillator in the representation which diagonalises the Hamiltonian.
2. Give the matrix theory of harmonic oscillator and obtain the energy eigenvalue spectrum.
3. Obtain the expressions for the first order corrections to the energy and wave function making the use of the non-degenerate stationary perturbation theory.

ASSIGNMENT -II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Explain the main stages involved in the WKB approximation. Use the technique to obtain the asymptotic solution of the one dimensional Schrödinger equation. Also arrive at the solution near a turning point.
2. Discuss in detail Fermi Golden rule.
3. Deduce relativistic Klein Gordon equation. Can we use this equation for pions and kaons. Show that its probability expression is indefinite.

ASSIGNMENT -III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Enumerate the two conditions for the validity of born approximation
2. Distinguish induced and spontaneous emission. Define Einstein's A and B coefficients and obtain the relation between them. Write down the expression for the transition probability per unit time for spontaneous emission.
3. Arrive at the non – relativistic Schrodinger's equation

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-22: CONDENSED MATTER PHYSICS
Batch   : AY 2018-2019
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. With a neat sketch, explain in detail about the powder photograph method of x- ray diffraction.
2. Explain different types of crystal imperfection with neat sketches.
3. Discuss in detail Free electron gas model in three dimension.

ASSIGNMENT -II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. What is Meissner effect? Prove that all superconductors are perfect dia-magnet in superconducting state.
2. Discuss in detail about properties of superconductor.
3. Discuss in detail about DC and AC Josephson effects

ASSIGNMENT -III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. What is Local or Internal field? Deduce the Clausius-Mossotti relation for a dielectric material.
2. Discuss in detail about Classical theory of electronic polarisibility.
3. Discuss the domain structure in ferromagnetic materials. Show how the hysteresis curve is explained on the basis of domain theory.

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

ASSIGNMENT -I

Marks- 25

Answer any one of the question not exceeding 1000 words

1. With a neat sketch, explain in detail about experimental determination of Zeeman effect with necessary theory.
2. Derive an expression for rotational spectra of rigid diatomic molecules.
3. Derive an expression for vibrational energy of diatomic moleccules.

ASSIGNMENT -II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. With a neat sketch, explain in detail about Rotation–vibration spectra of polyatomic molecules
2. Draw and explain IR Spectrophotometer.
3. Explain Quantum theory of Raman effect and also explain Rotational Raman Spectra.

ASSIGNMENT -III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Derive Bloch equation in NMR.
2. Discuss in detail about Transitions for axially and nonaxial symmetric systems in NQR .
3. Explain Recoilless absorption and emission of Mossbauer Spectroscopy

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

ASSIGNMENT -I

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Explain Spontaneous and Stimulated Emission of Radiation and derive the expression for Einstein's co efficient.
2. Discuss in detail about Threshold condition (Schawlow and Townes equation)
3. Discuss in detail CO_2 laser.

ASSIGNMENT -II

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Discuss in detail about Theory of optical activity and optical activity in quartz.
2. Discuss the principle of Optical fiber and Derive an expression for Numerical aperture and acceptance angel of optical fiber.
3. Discuss the term in Dispersion in optical fiber in detail.

ASSIGNMENT -III

Marks- 25

Answer any one of the question not exceeding 1000 words

1. Explain with neat sketch, homogeneous and heterogeneous LEDs
2. What is Plasma? Explain plasma display and its merits and demerits
3. Discuss in detail about liquid crystal and LCD.

TAMIL NADU OPEN UNIVERSITY
Chennai - 15
School of Science

Programme Code No : 281
Programme Name   : M.Sc., Physics
Course Code & Name : MPHY-25: NUMERICAL METHODS
Batch   : AY 2018-19
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 Newton Rapson method and Rate of convergence of Newton-Raphson method. Find the root of the equation $x^3 - 3x + 1 = 0$.
2. Explain Bairstow Method: Find the quadratic factor of the form $x^2 + px + q$ from the polynomial $X^4 - 3x^3 - 4x^2 - 2x + 8 = 0$ by Bairstow method with initial values $p_0 = q_0 = 1.5$.
3. Explain Jacobi Method and Find the eigen values and eigen vectors of the matrix by Jacobi's method

$$A = \begin{pmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{pmatrix}$$

ASSIGNMENT -II

Marks-25

Answer any one of the question not exceeding 1000 words

1. Explain Lagrange's Interpolation Formula for unequal intervals and Using Lagrange's interpolation formula calculate y(3) from the data given below.

x	0	1	2	4	5	6
y (x)	1	14	15	5	6	19

2. Explain Newton-cote's formula for Numerical Integration and Trapezoidal rule
3. Newton's backward difference formula for numerical differentiation and Find the first two derivatives of $(x)^{1/3}$ at $x = 50$ and $y = 56$ given in the table below

x	50	51	52	53	54	55	56
$y = x^{1/3}$	3.6840	3.7084	3.7325	3.7563	3.7798	3.8030	3.8259

ASSIGNMENT -IIII

Marks-25

Answer any one of the question not exceeding 1000 words

1. Explain simpson's 1/3 rule and 3/8th rule. Evaluate $\int_0^1 e^{-x^2}$ by dividing the range of integration into equal parts using Simpson's one-third rule.

2. Explain Gauss Two point formula and evaluate this $I = \int_1^2 \frac{dx}{x}$.

3. Explain FOURTH ORDER RUNGE-KUTTA METHOD and Find the values of y (1.1) using fourth order Runge-Kutta method, given that dy/dx = y2 + xy and y (1) = 1.

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