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

HOME / SPOT ASSIGNMENT

Programme Code No : 1181
Programme Name : B.Sc., Physics
Course Code & Name : BPHYS-51, ATOMIC PHYSICS
Batch   : AY 2021-22 (IIIrd YEAR   - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Give an account on the theory of Compton effect. Describe the experimental verification to determine the Compton shift.
2. Describe in detail the powder crystal method of determining crystal structures.
3. Deduce the expression for Zeeman shift with theoretical explanations and Illustrate the experimental arrangement to study the Zeeman effect.

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ASSIGNMENT - 2

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Give detailed description on the Millikan's oil drop experiment for the determination of electronic charge.

2. Enumerate the construction and working of Aston's Mass Spectrograph and show how it can be used in the detection of isotopes.

3. Enumerate the vector model of the atom and discuss the different quantum numbers associated with it.

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Programme Code No   : 1181
Programme Name   : B.Sc., Physics
Course Code & Name   : BPHYS-52, RELATIVITY AND QUANTUM MECHANICS
Batch   : AY 2021-22 (IIIrd YEAR   - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks   : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Discuss in detail about the physical origin of the uncertainty principle.

2. Derive the time-dependent Schrödinger equation for a particle moving in a force field.

3. Discuss the properties and characteristic equations for eigenfunction and eigen vectors.

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Batch   : AY 2021-22 (IIIrd YEAR - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks   : 15 (Average of Total No. of Assignments)

ASSIGNMENT –2

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Describe the Schrödinger Equation in 3D

2. Discuss the concept of three-dimensional harmonic oscillator giving appropriate examples.

3. Discuss the one-dimensional problems in quantum mechanics giving appropriate examples..

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Programme Code No   : 1181
Programme Name   : B.Sc., Physics
Course Code & Name   : BPHYS-53, DIGITAL ELECTRONICS
Batch   : AY 2021-22 (IIIrd YEAR - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks   : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Minimise the following Boolean function

$$F(A,B,C,D) = \sum_m (0,1,2,5,7,8,9,10,13,15)$$

2. Explain parallel in serial out and parallel in parallel out Shift Register

3. Discuss FM Demodulation Basics and Explain types of FM demodulator.

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Programme Name   : B.Sc., Physics
Course Code & Name   : BPHYS-53, DIGITAL ELECTRONICS
Batch   : AY 2021-22 (IIIrd YEAR - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks   : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 2

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Discuss Various Losses and distortion in Optical fibre and its special Applications.

2. Describe the operation of 4 bit SIPO & SISO shift register with the help of block diagram, truth table and timing diagram.

3. Explain asynchronous up/down counter

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Programme Code No   : 1181
Programme Name   : B.Sc., Physics
Course Code & Name   : BPHYS-54, MATHEMATICAL METHODS
Batch   : AY 2021-22 (IIIrd YEAR   - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks   : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 1

<div align="right">Max : 15 marks</div>

Answer any one of the question not exceeding 1000 words

1. Using Newton-Raphson method, find the root between 0 and 1 of $x^3 - 6x + 4 = 0$ correct to five decimal places.

2. Explain   Gauss   Elimination   method   and   solve   the   following   system

$$3x + 2y + z = 11$$
$$2x + 3y + z = 13$$
$$x + y + 4z = 12$$

3. Example: Use Richardson extrapolation to evaluate the integral $\int_0^{1.2} e^x \, dx$

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Programme Code No   : 1181
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Course Code & Name   : BPHYS-54, MATHEMATICAL METHODS
Batch   : AY 2021-22 (IIIʳᵈ YEAR - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks   : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 2

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Evaluate the integral $\int_0^{1.2} e^x \, dx$, taking six intervals by using trapezoidal rule up to three significant figures.

2. Compute $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at the point $x = 0.2$ using Stirling's formula for the data given in th following table

x	0	0.1	0.2	0.3	0.4	0.5
y	0	0.10017	0.20134	0.30452	0.41076	0.52115

3. Given $y' = x^3 + y$, $y(0) = 2$, compute $y(0.2)$, $y(0.4)$ and $y(0.6)$ using the Runge-Kutta method of fourth order.

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Programme Code No   : 1181
Programme Name   : B.Sc., Physics
Course Code & Name   : BPHYSE-51A, ENERGY PHYSICS
Batch   : AY 2021-22 (IIIʳᵈ YEAR - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks   : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 1

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Explain non-conventional energy sources, give its merits and demerits.

2. Explain the Principle and Working of Box Type Solar Cooker

3. Explain the concept of solar water heating system in detail.

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Course Code & Name : BPHYSE-51A, ENERGY PHYSICS
Batch   : AY 2021-22 (IIIrd YEAR - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 2

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. Explain the main components of wind mill.

2. Explain the construction and working of Fuel cell.

3. Explain Ocean thermal energy conversion and its various Types

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ASSIGNMENT – 1

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. A solid cylinder (i) rolls, (ii) slides from rest down an incline. Neglecting friction, compare the velocities in the two cases when the cylinder reaches the bottom of the incline.

2. Find the work done when (i) 1 g of O_2 at N.T.P. and (ii) 1 g of He at N.T.P. are respectively compressed adiabatically to half its volume and double its pressure. Given $\Upsilon = 1.40$ and R = 8.3×10^7 erg/°C/mol.

3. The electric potential in a certain region of space is given by

$$\phi(\vec{r}) = \frac{q}{4\pi\epsilon_0} \frac{e^{-r/\lambda}}{r}$$

Where λ is a constant and $\vec{r}$ is the position vector. find the corresponding electric field $\vec{E}(\vec{r})$ and charge density $\rho(\vec{r})$.

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Programme Code No   : 1181
Programme Name   : B.Sc., Physics
Course Code & Name   : BPHYSE-51B, PROBLEM SOLVING SKILLS IN PHYSICS
Batch   : AY 2021-22 (IIIrd YEAR - V SEMESTER) :
No.of Assignment   One Assignment for Each 2 Credits
Maximum CIA marks   : 15 (Average of Total No. of Assignments)

ASSIGNMENT – 2

Max : 15 marks

Answer any one of the question not exceeding 1000 words

1. For angular momentum operator $\hat{L}$, prove that

$$\left[\hat{L}_x, \hat{L}_y\right] = \iota\hbar L_z; \left[\hat{L}_y\hat{L}_z\right] = \iota\hbar L_x; \left[\hat{L}_z\hat{L}_x\right] = \iota\hbar L_y$$

Also, show that $\hat{L}^2$ commutes with each of the three components $\hat{L}_x, \hat{L}_y$ and $\hat{L}_x$.

2. Two cylindrical shafts have the same length and mass and are made of the same material- one solid, the other hollow. The external radius of the hollow cylinder is twice the internal radius. Compare (i) their torsional rigidities. Compare (ii) the maximum strains produced by equal twisting torques.

3. If the rate of change of surface energy of a liquid with temperature be proportional directly to the absolute temperature be proportional directly to the absolute temperature T, show that the surface tension is given by $S = aT^2 + bT + c, where\ a, b, c$ are constants.