		Model Question Paper **ENGINEERING PHYSICS** **(14PHY12/14PHY22)**	
Time: 3 hrs.			Max. Marks: 100

Note: Answer any FIVE full questions, choosing one full question from each module.

MODULE 1

1)	a.	Explain in brief Compton effect on the basis of quantum hypothesis .What is its physical significance?	(6 Marks)
	b.	Explain the terms Probability density, Normalization. Mention any two characteristics of wave function.	(6 Marks)
	c.	Obtain relationship between Group velocity and phase velocity.	(4 Marks)
	d.	What is De Broglie wavelength of a proton whose energy is 3eV.given mass of proton = 1.67×10^{-27} kg.	(4 Marks)

OR

2)	a.	Set up the one dimensional time independent Schrodinger wave equation.	(7 Marks)
	b.	State De Broglie hypothesis. Show that the De Broglie wavelength of an electron is found to be equal to $\dfrac{12.26}{\sqrt{V}} A^0$	(6 Marks)
	c.	State and explain Heisenberg's Uncertainty principle.	(3 Marks)
	d.	The position and momentum of 1keV electron are simultaneously determined. If its position is located within $1A^0$, find the uncertainty in the determination of its momentum.	(4 Marks)

MODULE 2

3)	a.	Define the terms 1) Drift velocity 2) Mean free path 3) Relaxation time 4) Resistance	(4 Marks)
	b.	Discuss in brief the failures of CFET.	(6 Marks)
	c.	What are charge carriers in semiconductors. State law of mass action. From this law obtain expression for Fermi level in an intrinsic semiconductor.	(6 Marks)
	d.	Write a note on high temperature superconductors.	(4 Marks)

		OR	
4)	a.	What is hall effect? Obtain expression for Hall voltage in terms of Hall coefficient.	(7 Marks)
	b.	What are the types of super conductors. Explain.	(6 Marks)
	c.	The Hall coefficient of -3.68×10^{-5} m^3/C. What is type of charge carriers? Also calculate the carrier concentration.	(3 Marks)
	d.	Explain in brief the construction and working of maglev.	(4 Marks)
		MODULE 3	
5)	a.	Explain the construction and working of CO_2 laser.	(7 Marks)
	b.	Obtain expression for energy density in terms of Einstein's A & B co efficient.	(5 Marks)
	c.	Discuss point to point communication using an optical fiber with the help of block diagram.	(4 Marks)
	d.	Calculate numerical aperture, acceptance angle and critical angle of a fiber having a core RI 1.50 and cladding RI 1.45.	(4 Marks)
		OR	
6)	a.	What is attenuation? Obtain expression for attenuation co-efficient in an optical fiber of length L.	(6 Marks)
	b.	Explain the construction and reconstruction of Hologram.	(6 Marks)
	c.	Obtain expression for propagation of light through an optical fiber.	(5 Marks)
	d.	Define the terms 1) Acceptance angle. 2) Population inversion 3) Simulated emission.	(3 Marks)
		MODULE 4	
7)	a.	Discuss the seven crystal systems in terms of Lattice parametric consideration and type of bravais lattice.	(7 Marks)
	b.	Calculate the atomic packing fraction of BCC and FCC.	(6 Marks)
	c.	Obtain Miller Indices of a crystal plane with intercepts. $$x = \frac{1}{3a}, \quad y = 1b \text{ and } z = \frac{1}{2}c$$	(3 Marks)
	d.	Discuss the crystal structure of diamond.	(4 Marks)
		OR	

8)	a.	Explain the Bragg's X ray diffractometer. How is crystal structure identified.	(7 Marks)
	b.	Explain in brief Principle and working of LCD, mention three uses.	(8 Marks)
	c.	Obtain expression for inter planar spacing in terms of Miller Indices.	(5 Marks)

MODULE 5

9)	a.	What is Mach number. Distinguish between ultrasonic and acoustic waves.	(4 Marks)
	b.	Describe the operation and characteristic of Reddy Shock tube.	(6 Marks)
	c.	What is CNT – Mention two properties. How is its synthesized using pyrolysis method.	(7 Marks)
	d.	Mention the principle and 2 applications of SEM.	(3 Marks)

OR

10)	a.	Derive the Normal shock relationship using Rankine – Hugonit equation.	(6 Marks)
	b.	Discuss the ball Milling and Sol Gel Methods of Synthesis of Nano Materials. Mention advantages of each method.	(10 Marks)
	c.	What is a shock wave? Mention three applications.	(4 Marks)