WALCHAND COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Visharambag, Sangli – 416415

First Year B.Tech. Group A (ELN, CSE. IT)
ESE , ODD SEMESTER, AY 2022-23
Engineering Physics (6PH101)

FE-ALL-ESE
ODD-2022-23-ESE

ESE

PRN: _____

Day & Date: Monday, 27/02/2023 Time : 10.30 am to 12.30 pm

Max Marks: 50

IMP: Verify that you have received question papers with correct course code, branch etc.

Instructions
a) All questions are compulsory.
b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
c) Assume suitable data wherever necessary.
d) Figures to the right of question text indicate full marks.
e) Mobile phones, smart gadgets and programmable calculators are strictly prohibited.
f) Except PRN anything else writing on question paper is not allowed.
g) Exchange/Sharing of stationery, calculator etc. not allowed.

Text on the right of marks indicates course outcomes (Only for faculty use)		Marks	
Q1	**A)**	Derive Schrödinger's time dependent wave equation for a free particle in one dimension for matter waves. OR State Heisenberg Uncertainty Principle. Prove the relation of Heisenberg Uncertainty Principle $\Delta p \cdot \Delta x \geq \hbar$.	**5**	CO2
	B)	What is half-period zone? Show that resultant amplitude at a point is only half the amplitude of first half-period zone.	**5**	CO2
	C)	What is piezoelectric effect? Draw a circuit diagram of piezoelectric oscillator and describe its working.	**5**	CO2
Q2	**A)**	What is semiconductor? Explain classification of solid on basis of band theory.	**5**	CO2
	B)	Explain energy levels in a band for Silicon Solid.	**5**	CO3
	C)	In a solid, consider the energy level lying 0.01eV below Fermi level. What is the probability of this level being occupied by an electron at temperature 300K? (Given: kT= 0.026eV at 300 K)	**2**	CO3
Q3	**A)**	Draw the block diagram of automatic temperature control system and explain in short.	**5**	CO3
	B)	Explain five laws of Thermocouple.	**5**	CO2

Q4 A) What is meant by nanoparticles? With a simple example explain why the surface area to volume ratio is large for nanoparticles. 3

B) With a neat sketch describe ball milling method for the synthesis of nanoparticles. 5

C) Define carbon nanotube. What are the types of carbon nanotubes? Mention any two applications of carbon nanotubes. 5

..... End of question paper .....