Printed Page:- **Subject Code:- ACSBS0101**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: I - CARRY OVER THEORY EXAMINATION - MAY 2023

Subject: Physics for Computing Science

Time: 2 Hours **Max. Marks: 50**

General Instructions:

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

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION A **15**

1. Attempt all parts:-

1-a. If the amplitude of vibration is decaying gradually, it is called (CO1) 1

(a) Damping

(b) SHM

(c) Periodicity

(d) Linearity

1-b. In interference pattern dark fringe is formed due to (CO2) 1

(a) bright light

(b) constructive interference

(c) destructive interference

(d) none

1-c. Wave function is basically a (CO3) 1

(a) linear function

(b) quadratic function

(c) complex function

(d) none

1-d. What is the atomic radius of a BCC crystal structure? (CO4) 1

(a) a/2

(b) a/4

(c) a√2/4

(d) a√3/4

1-e. Which of the following is an example of optical pumping (CO5) 1

(a) Ruby laser

(b) Helium-Neon laser

(c) Semiconductor laser

(d) Dye laser

2. Attempt all parts:-

2.a. Illustrate the equation of continuity for current density. (CO1) 2

2.b. What are main differences between interference and diffraction? (CO2) 2

2.c. Explain the physical significance of wave function. (CO3) 2

2.d. Differentiate between crystalline and non-crystalline solids: (CO4) 2

2.e. Illustrate some applications of optical fibres. (CO5) 2

SECTION B **15**

3. Answer any <u>three</u> of the following:-

3-a. An 8 kg mass attached to a spring is observed to oscillate with a period of 2 seconds. What is the period of oscillation if a 12 kg mass is attached to the spring? (CO1) 5

3-b. If the refractive index of a polarizer is 1.9218. What will be the polarization angle and angle of refraction? (CO2) 5

3.c. Calculate the smallest possible uncertainty in the position of an electron moving with velocity $3x10^7$m/s (CO3) 5

3.d. Lattice constant for of cubic lattice is a. Deduce the spacing between (011), (101) and (112) planes. (CO4) 5

3.e. What is the maximum possible cycle efficiency of a heat engine operating between a heat source at 400^0C and a heat sink at 30 ^{0}C? (CO5) 5

SECTION C **20**

4. Answer any <u>one</u> of the following:-

4-a. Prove that the total energy in simple harmonic motion remains constant. (CO1) 4

4-b.	Derive Maxwell's 1st and 2rd equations. (CO1)	4

5. Answer any <u>one</u> of the following:-

5-a.	Derive an expression for intensity distribution in interference pattern obtained by Young's double slit experiment. (CO2)	4
5-b.	What do you understand by polarization of light? Distinguish between unpolarized and polarized light. (CO2)	4

6. Answer any <u>one</u> of the following:-

6-a.	What do you mean by Heisenberg's uncertainty principle? Explain the non-existence of electron in the nucleus. (CO3)	4
6-b.	What do you mean by a particle in a box? Show that the energy of a electron in the box varied as the square of the natural numbers. (CO3)	4

7. Answer any <u>one</u> of the following:-

7-a.	Sketch the lattice structure of (a) simple cubic (b) body centered cubic and (c) face centered cubic. How they differ from each other? (CO4)	4
7-b.	Write down some important applications of conductors, semiconductors and insulators. Also diagramatically show the difference between the three. (CO4)	4

8. Answer any <u>one</u> of the following:-

8-a.	Describe the basic principle of an optical fibre. Illustrate the structural parts of optical fibre. (CO5)	4
8-b.	Illustrate zeroth and first law of thermodynamics and their applications as well. (CO5)	4