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 - AUGUST 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. Rotation of earth is.. (CO1) 1

(a) Periodic motion

(b) SHM

(c) Vibratory Motion

(d) Linear Motion

1-b. Diffraction takes place due to (CO2) 1

(a) change in velocity from one medium to another

(b) change in intensity around the sharp corners

(c) bending around the sharp corners

(d) none

1-c. Freely moving particle inside the 1-d box has (CO3) 1

(a) only kinetic energy

(b) potential energy

(c) both energy

(d) none

1-d. How many Bravais lattices are present in the crystal systems? (CO4) 1

(a) 12

(b) 13

(c) 14

(d) 10

1-e. Ruby laser is which type of laser? (CO5) 1

(a) liquid state

(b) gaseous state

(c) solid state

(d) none

2. Attempt all parts:-

2.a. What is damping in periodic motion? (CO1) 2

2.b. Write Brewster's law equation? (CO2) 2

2.c. Define group velocity and phase velocity. (CO3) 2

2.d. What is the difference between crystalline and amorphous solids? (CO4) 2

2.e. Illustrate the first law of Thermodynamics. (CO5) 2

SECTION B **15**

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

3-a. Calculate the amplitude, angular frequency, frequency, time period and initial phase for the simple harmonic oscillation given by $y = 2 \sin (30\pi t + 2.3)$. (CO1) 5

3-b. A certain polarizer has a refractive index of 1.33. Find the polarization angle and angle of refraction? (CO2) 5

3.c. An electron is confined to a box of length 10^{-8} m. Calculate the minimum uncertainty in its velocity (CO3) 5

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

3.e. A silica glass optical fibre has a core refractive index of 1.47 and cladding refractive index of 1.450. Calculate the numerical aperture of the optical fibre (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 3rd equation. (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.	Find the expression for the energy state of a particle in one dimensional box. (CO3)	4

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

7-a.	Describe with examples :(a) Unit cell (b) Atomic packing density (c) Miller indices. (CO4)	4
7-b.	Define conductors, semiconductors and insulators. Differentiate between them on the basis of band width. Cite examples as well. (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.	What do you mean by heat engine? Also illustrate some application of thermodynamics. (CO5)	4