Printed Page:- 03 **Subject Code:- BCSBS0101**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: I - THEORY EXAMINATION - (2023 - 2024)

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. In damped oscillation the directions of the restoring force and the resistive force (CO1) 1

(a) are the same

(b) are opposite

(c) may be same or opposite

(d) have no relation with each other

1-b. The ray which obeys Snell's law of refraction is known as (CO2) 1

(a) ordinary ray

(b) extraordinary ray

(c) simple ray

(d) electric ray

1-c. Which law is Maxwell's IIIrd equation? (CO3) 1

(a) Gauss' law

(b) Lenz's law

(c) Faraday's law

(d) Ampere's Law

1-d. The internal energy of a substance depends on (CO4) 1

(a) Pressure

(b) Volume

(c) Temperature

(d) Velocity

1-e. The Ruby laser is a kind of solid-state laser in which the wavelength of laser is ..... (CO5) 1

(a) 6328Å

(b) 6943Å

(c) 10600Å

(d) None of the above

2. Attempt all parts:-

2.a. What do you understand by simple harmonic motion (SHM)? (CO1) 2

2.b. What are O-ray and E-ray in double refraction? (CO2) 2

2.c. What is displacement current? (CO3) 2

2.d. What is the first law of thermodynamics? (CO4) 2

2.e. What do you mean by a metastable state? (CO5) 2

SECTION-B 15

3. Answer any three 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. Two slits separated by a distance of 0.2 mm are illuminated by a monochromatic light of wave length 550 nm. Calculate the fringe width on a screen at a distance of 1 m from the slits. (CO2) 5

3.c. If the relative permeability and relative permittivity of the medium are 1.0 and 2.25, respectively. Find the speed of the electromagnetic wave in this medium. (CO3) 5

3.d. 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? (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 one of the following:-

4-a. Find the expression for quality factor in damped harmonic oscillator. (CO1) 4

4-b. What is the differential equation for damped harmonic oscillations? Find the solution of it for the underdamped condition. (CO1) 4

5. Answer any one of the following:-

5-a. Derive an expression for n^{th} dark Newton's ring in reflected light. (CO2) 4

5-b. Explain the production of linearly polarised light. (CO2) 4

6. Answer any one of the following:-

6-a.	Derive equation of continuity for current density. (CO3)	4
6-b.	Explain the difference among the insulators, semiconductors and conductors with the help of energy band diagram. (CO3)	4

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

7-a.	What is thermodynamics? State the zeroth law of thermodynamics. (CO4)	4
7-b.	What do you mean by heat engine? Define the efficiency of heat engine. (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.	Discuss the construction and working of neodymium laser. (CO5)	4