JHARKHAND Rai University
RANCHI

**End Semester/Reappear (Semester I) Examination December, 2024**

**Programme:B.Tech (MiE/CSE)**

**Course: Physics-I** **Full Marks: 70**

**Course Code: 8BSC101/3BSC101** **Time: 3 Hrs.**

**Enrolment no. _____**

| Q.No. | Questions | CO | Bloom Taxonomy Category | Marks |
|---|---|---|---|---|
| | **Section I** | | | |
| 1 | **Short Answer type questions.** | | | **4 x 5 = 20** |
| a | Explain dielectric and types of dielectrics. | CO1 | Remember | |
| | or | | | |
| | Explain Laplace's and Poisson's equations for electrostatic potential. | CO1 | Understand | |
| b | Describe Dual nature of matter and explain De Broglie waves. | CO2 | Apply | |
| | or | | | |
| | Define Photons. What are the properties of Photons? | CO2 | Understand | |
| c | Explain conservative and non conservative force. | CO3 | Understand | |
| | or | | | |
| | State and prove law of conservation of Linear Momentum & Angular momentum. | CO3 | Understand | |
| d | Explain Total Internal Reflection. What are the applications of the same? | CO4 | Understand | |
| | or | | | |
| | What are the properties of Laser? What are the applications of Laser? | CO4 | Understand | |
| | **Section II** | | | |
| **Long Answer type questions.** | | | | **3 x 10 = 30** |
| 2 | State and explain Euler's law of motion. | CO3 | Apply | |
| | or | | | |
| | Derive the position vector of Centre of mass of two particle system. | CO3 | Apply | |
| 3 | Explain with diagram Ruby Laser. | CO4 | Apply | |
| | or | | | |
| | Explain the types of Lasers. Explain gas laser (He-Ne). | CO4 | Understand | |
| 4 | Explain P-I-N Photodiode with diagram. | CO5 | Apply | |
| | or | | | |
| | Explain Avalanche Photodiode with diagram. | CO5 | Apply | |
| | **Section III** | | | |
| | **Application based questions** | | | **1 x 20 = 20** |
| 5 | a. Solve Laplace's equation to find the potential at a distance r from the axis of an infinitely long conducting cylinder with a surface charged density σ.<br>b. Evaluate an expression for energy stored in dielectric in electrostatic field. | CO1 | Evaluate | |
| | or | | | |
| | a. Two Concentric conducting spherical shells of radii $a_1$ & $a_2$ are charged to a potential $V_1$ & $V_2$ respectively. Determine the net electric Potential.<br>b. Evaluate an expression for magnetic field due to a straight wire carrying current. | CO1 | Evaluate | |

**Course Outcome:**

On the completion of the Course, the students will be able to:

CO1: Apply the basic concepts of electromagnetic theory.

CO2: Explain the dual nature of matter and wave equation.

CO3: Demonstrate the types of motion and different types of forces.

CO4: Describes the different Phenomena of Wave Optics, principles of lasers, types of lasers and their application.

CO5: Design the different types of diodes.