

Code No.: AP102BS

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**CMR ENGINEERING COLLEGE : HYDERABAD  
UGC AUTONOMOUS**

**I-B.TECH-I-Semester End Examinations (Supply) - March- 2023**

**APPLIED PHYSICS  
(Common for CSC, CSD, CSE, IT)**

**[Time: 3 Hours]**

**[Max. Marks: 70]**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART-A**

**(20 Marks)**

1. a) Calculate the de-Broglie wavelength of an electron of energy 100 eV. [2M]
- b) Explain the concept of hole and gives its advantage. [2M]
- c) What is meant by semiconductor? Give examples. [2M]
- d) What is meant by LED? Give its principle. [2M]
- e) What is meant by Ferro electricity? List out some Ferro electric materials. [2M]
- f) Define magnetic field intensity and intensity of magnetization with its unit. [2M]
- g) What are conditions are required for laser action? [2M]
- h) How will you classify the optical fibers? [2M]
- i) Discuss the concept of surface to volume ratio. [2M]
- j) Explain quantum confinement phenomenon? [2M]

**PART-B**

**(50 Marks)**

- 2.a) Derive time-independent Schrodinger wave equation? [5M]
- b) Explain the concept of wave-particle duality and obtain an expression for the wavelength of matter waves. [5M]

**OR**

3. Explain the origin of energy band when the electron is moving in a periodic potential. Also explain the effective mass of electron in a periodic potential. [10M]
4. What is hall effect? Derive expression for the hall coefficient for p-type and n-type semiconductors. [10M]

**OR**

5. Explain the principle, construction and working of solar cell and discuss the advantages of it. [10M]
6. What is meant by local field in dielectrics and how it is calculated for a cubic structure? [10M]

**OR**

7. Mention the different types of polarization mechanisms in dielectrics and derive the polarizability equation for in terms of electronic polarization. [10M]

8. Mention the different methods of pumping and explain the construction and working principle of RUBY laser. [10M]

**OR**

9. Derive numerical aperture and acceptance angle of fiber optical fiber. Mention the advantages of optical fiber for communications as a waveguide. [10M]

10. Explain Physical Vapor Deposition technique for synthesis of nanomaterials. [10M]

**OR**

11. Describe the principle, construction and working of scanning electron microscope. Give its advantages and disadvantages. [10M]

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