

Code No: E-5603/N/AICTE

FACULTY OF ENGINEERING
B.E. (ECE/M/P/AE/AI&DS/AI&ML/IoT/IT) I - Semester (AICTE) (Main & Backlog) (New)
Examination, February/ March 2023

Subject: Physics

Time: 3 Hours

Max. Marks: 70

- Note:** (i) First question is compulsory and answer any four questions from the remaining six questions. Each questions carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1. a) What is Burger's vector?
b) How hole is created in semiconductor?
c) Write few applications of Ferroelectrics.
d) State the concept of Displacement current.
e) Draw the structure of BaTiO_3
f) What is critical magnetic field in superconductivity?
g) What is population inversion?
2. a) Evaluate an equation to find the interplanar spacing (Cubic system) of two parallel planes.
b) Deduce an expression for the equilibrium concentration of Frenkel defects in a crystal. ✶
3. a) Discuss the Kronig-Penny model for the motion of electron in a periodic potential. ,
b) What kinds of polarizations exist in dielectrics? And clarify.
4. a) Describe the de Broglie's hypothesis of duality of matter particles and write the properties of matter waves.
b) Deduce an expression for Poynting vector.
5. a) What is Hysteresis curve? Distinguish soft and hard magnetic materials.
b) What is superconductivity? Explain BCS theory of superconductivity. •
6. a) Describe the construction and working principle of Ruby laser with neat sketch.
b) Define numerical aperture and deduce an expression for numerical aperture.
7. a) Classify the materials into conductors, semiconductors and insulators using band theory of solids.
b) Estimate quantized energy states for a particle in 1-D box? ..

FACULTY OF ENGINEERING

**B.E. (ECE/M/P/AE/AI&DS/AI&ML/IoT/IT) I - Semester (AICTE) (Backlog) (New) Examination,
September /October 2023**

Subject: Physics

Time: 3 Hours

Max. Marks: 70

- Note:** (i) First question is compulsory and answer any four questions from the remaining six questions. Each questions carries 14 Marks.
 (ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
 (iii) Missing data, if any, may be suitably assumed.

1. a) What are Miller Indices? Give their significance.
 b) Mention the drawbacks of free electron theory of metals.
 c) Distinguish between conduction current and displacement current.
 d) Explain Meissner effect in superconductors.
 e) Mention few applications of Lasers.
 f) Write the physical significance of wave function ψ .
 g) Draw the hysteresis curve? Locate remanent and coercive field on the curve.
2. a) Explain Powder Diffraction method to determine the lattice constant of a given crystal.
 b) Obtain an expression for concentration of Schottky defects in case of ionic crystals.
3. a) What is Hall effect? Deduce an expression for Hall coefficient.
 b) Define dielectric constant. Determine the dielectric constant of a given material by using capacitance bridge method. <https://www.osmaniaonline.com>
4. a) Derive time dependent Schrodinger equation.
 b) Deduce the plane electromagnetic wave equation in free space from Maxwell's equations.
5. a) Explain Weiss molecular field theory of ferromagnetism and obtain Curie-Weiss law.
 b) Explain the general properties of Superconductors? Explain Type-I and Type-II superconductors.
6. a) Describe the construction and working of He-Ne Laser with energy level diagram.
 b) What is optical fibre? Discuss the fibre drawing process (double crucible method).
7. a) Define dielectric polarization and derive an equation for electronic polarizability in dielectric material.
 b) Explain the principle of light propagation through an optical fibre and deduce an expression for acceptance angle and numerical aperture.

Code No. 2957/AICTE/M

FACULTY OF ENGINEERING
B.E. (CE/EE/IOSL/ECE/CSE/CME) (AICTE) II-Semester (Main & Backlog)
Examination, December 2020

Time : 2 Hours

Subject: Physics

Max. Marks: 70

Note: Answer

e questions from Part-A & any four questions from Part-B.

PART - A (5 X 2 = 10 Marks)

- 1 Draw a plane in cubic crystal which have miller Indices < 101 .
- 2 What is Burgers vector?
- 3 Explain the concept of a hole.
- 4 What is a ferroelectric materials, and mention their two applications?
- 5 Write the physical significance of wave function.
- 6 What are D, E and P and write the relation between them?
- 7 Distinguish between soft and hard magnetic materials.
- 8 Prove that superconductor is a diamagnetic material.
- 9 What is population Inversion? Explain.
- 10 Define Acceptance angle and Numerical aperture in fiber optics.

PART - B (4 X 15 = 60 Marks)

- 11 Derive an equation for concentration of Frenkel defects in an ionic crystal.
- 12 Define Hall effect and derive an equation for Hall coefficient.
- 13 Apply Schrodinger equation to particle in 1-dimensional box, and find its energy.
- 14 Explain Weiss molecular field theory of ferromagnetism.
- 15 Explain general properties of superconductors and discuss BCS theory.
- 16 Explain construction and production mechanism of Ruby Laser.
- 17 Derive an equation for Electromagnetic wave in a free space and explain Poynting theorem.

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