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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(Artificial Intelligence & Machine
Learning/CE/CSE/DS/CS&D/ECE/EEE/EE/IT/ME/Robotics & Artificial
Intelligence/Internet of Things and Cyber Security including Block Chain
Technolog) (Sem.-1)**

ENGINEERING PHYSICS

Subject Code : BTPH101-23

M.Code : 93794

Date of Examination: 14-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. **SECTION - B & C** have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. **Write short notes on :**

- a) What is a Unit Cell?
- b) Distinguish between Intrinsic and Extrinsic Semiconductors.
- c) What are Type I and Type II Superconductors?
- d) Show that Curl of gradient is zero.
- e) What is Uncertainty Principle?
- f) Distinguish between Stimulated emission and Stimulated absorption.
- g) What is Holography?
- h) Define Normalized frequency.
- i) What are Carbon Nanotubes (CNTs)?
- j) What is the use of He in He-Ne laser?

SECTION-B

2. What are X-rays? Discuss the diffraction of X-ray from crystals and obtain Bragg's law.
3. What is Photodetector? Explain the construction and working of Photodiode. Discuss the disadvantages of Photodiode.
4. What is Meissner effect? Explain it using London equations.
5. a) Write the Maxwell's equations and discuss the physical significance of each equation.
b) Explain Dielectric polarization. What is Displacement current?

SECTION-C

6. What are Einstein's coefficients? Derive the relation between Einstein's coefficients and discuss the physical interpretation.
7. Define Acceptance angle and Numerical Aperture. Derive the expression for Acceptance Angle.
8. What is Photoelectric Effect? Explain the laws of Photoelectric Effects using Quantum Approach.
9. Explain the synthesis of nanomaterials using Ball Milling and Sol-gel Techniques.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.