Subject Code: R13203/R13 **Set No - 1**

I B. Tech II Semester Supplementary Examinations April/May - 2017

ENGINEERING PHYSICS

(Com. to CE, ME, CSE, PCE, IT, CHEM, AE, AME, MM, PE, MTE, TE)

Time: 3 hours **Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**
Answering the question in **Part-A** is Compulsory,
Three Questions should be answered from **Part-B**

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PART-A

1. (a) What is polarization? Explain double refraction in crystals.
   (b) What are Bravais lattices? Define primitive cell and unit cell.
   (c) What are SQUIDS?
   (d) Convert Maxwell's first equation (Gauss law of electrostatics) from integral to differential form.
   (e) What is meant by Fermi energy? What is its physical significance?
   (f) Distinguish between intrinsic and extrinsic semiconductors.
   [3+4+4+3+4+4]

PART-B

2. (a) Explain the concept of interference in thin films with necessary theory.
   (b) In Newton's rings experiment, diameter of 10^{th} dark ring in air when viewed under reflected light of wavelength $6000A^{o}$ is 0.5 cm. Find the radius of curvature of the lens.
   (c) Distinguish between Type-I and Type-II superconductors. [8+4+4]

3. (a) Explain the principle of propagation of light through optical fiber.
   (b) Derive an expression for acceptance angle and numerical aperture of an optical fiber.
   (c) Calculate the number of atoms per unit cell, atomic radius, coordination number and packing factor for Body Centered Cubic structure. [4+8+4]

4. (a) Derive an expression for the internal field in dielectric solid materials.
   (b) Write short notes on LED and solar cell. [8+8]

5. (a) State and explain Sabine's formula for reverberation time of a hall.
   (b) Derive the Schrodinger's time independent wave equation. [8+8]

6. (a) Explain the meaning of density of states. Derive an expression for the number of allowed states per unit volume of a solid.
   (b) Draw and explain B-H curve for a ferromagnetic material. [8+8]

7. (a) Derive an expression for the charge density in terms of Hall voltage and further explain how the mobility of the charge carriers can be evaluated by knowing the conductivity.
   (b) A 100μm thick sample of silicon is doped with 10^{28} phosphorous atoms/m^3. Find the Hall voltage in the sample if it carries a current of 1mA and is placed in a magnetic field of 0.1Wb/m^2 (assume electron mobility=0.07m^2/V.s).
   (c) Distinguish between interference and diffraction. [8+4+4]