**Subject Code: R13103/R13**                    | Set No - 1 |

**I B. Tech I Semester Supplementary Examinations Dec- 2016**
**ENGINEERING PHYSICS**
**(Common to ECE, EEE, EIE, Bio-Tech, EComE, Agri.E)**

**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)  Describe the phenomenon of double refraction.
   (b)  Explain the three level energy scheme for lasing action.
   (c)  Write a note on dielectric loss of a material.
   (d)  State and write Maxwell's equations in differential form.
   (e)  What are the main assumptions of quantum free electron theory?
   (f)  Explain the working principle of an LED.

                                                          [3+4+3+4+4+4]

## PART-B

2.(a)  Explain the phenomenon of interference of light due to thin parallel film and find the conditions for maxima and minima.
  (b)  When Newton's rings are observed in reflected light of wavelength 5900AU, the diameter of the $10^{th}$ dark ring is found to be 0.50cm. Find the radius of curvature of the lens and thickness of the air film?
  (c)  Distinguish between Type-I and Type-II superconductors.                    [8+4+4]

3.(a)  Explain with neat diagram the principle of operation of an optical fibre.
  (b)  Calculate the numerical aperture and acceptance angle of an optical fibre with core and cladding of refractive indices 1.55 and 1.5 respectively.
  (c)  Explain conductivity of a semiconductor.                                   [8+4+4]

4.(a)  What are the different types of polarizations? With a neat diagram explain and derive electronic polarizability.
  (b)  Apply Schrodinger's wave equation to obtain the permitted energy values and wave functions for a particle in a one-dimensional potential box.                [8+8]

5.(a)  What is meant by reverberation? Discuss Sabine's formula.
  (b)  Analyze qualitatively Fraunohofer diffraction at double slit with suitable diagram.     [10+6]

6.(a)  Write the conclusions given by Kronig-Penny model.
  (b)  Explain temperature dependence of suceptability of magnetic materials.
                                                          [8+8]

7.(a)  Deduce an expression for carrier concentration of electrons in the conduction band of an intrinsic semiconductor.
  (b)  Derive Bragg's law of x-ray diffraction.
  (c)  Define a quarter wave plate and write the expression for its thickness.    [8+4+4]