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

I B.Tech II Semester Supplementary Examinations Dec./Jan. – 2015/2016

ENGINEERING PHYSICS

(Common to CE, ME, CSE, PCE, IT, Chem E, Aero E, Auto E, Min E, Pet E, Metal 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) State and explain Rayleigh's criterion for resolution.
   (b) Define numerical aperture and express it in terms of fractional refractive index change.
   (c) How does a SQUID work?
   (d) State Gauss divergence and Stokes theorems.
   (e) Derive an expression for the de-Broglie wavelength of an electron accelerated through a potential of V volts.
   (f) Distinguish between direct and indirect bandgap semiconductors

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

PART-B

2. (a) How interference phenomenon occurs in Newton's Rings? Derive the conditions for bright and dark circular rings in terms of Diameters.
   (b) Explain the phenomenon of double refraction.
   (c) What is dielectric break down? Explain.

[8+4+4]

3. (a) Describe the construction of He-Ne Laser. Explain its lasing action with energy level diagram.
   (b) Discuss characteristics of lasers.
   (c) Deduce an expression for conductivity of an intrinsic semiconductor.

[8+4+4]

4. (a) What are magnetic materials? Distinguish between ferro, anti ferro and ferri magnetic materials.
   (b) Define Electric polarization and discuss various types of polarizations in dielectrics.
   (c) What are positive and negative crystals?

[8+4+4]

5. (a) State and explain Maxwell's equations and express them in differential form.
   (b) A hall of volume 5500m^3 is found to have a reverberation time of 2.3s. The sound absorbing surface of the hall has an area of 750m^2. Calculate the average absorption coefficient.
   (c) Explain the terms (i) Dielectric loss (ii) Dielectric strength [8+4+4]

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6. (a) Explain the classification of solids into conductors, semi conductors and insulators on the basis of Band theory.
   (b) Describe the basic assumptions of classical free electron theory.
   (c) Determine the lattice constant for a FCC crystal having an atomic radius of 0.1476nm

[8+4+4]

7. (a) What is Hall Effect? Deduce an expression for Hall coefficient.
   (b) Explain any four applications of Hall coefficient.
   (c) Explain the concept of Josephson junction.

[8+4+4]

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