Code No: R13203 **R13** **SET-1**

I B. Tech II Semester Supplementary Examinations, December - 2020
ENGINEERING PHYSICS
(Com. to CE,ME,CSE,PCE,IT,Chem E, Aero E, Auto E,Min E,Pet E, Metal E & Textile Engg)

Time: 3 hours Max. Marks: 70

Note: 1. Question paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is Compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) Explain interference in thin films. (4M)

   b) Find the numerical aperture and acceptance angle of an optical fibre, if the refractive indices for core and cladding are 1.6 and 1.5 respectively. (3M)

   c) What are the Miller indices and explain their importance? (4M)

   d) Explain (i) Sabine's formula (ii) Eyring's formula (4M)

   e) How energy bands are formed? Explain. (4M)

   f) Calculate the conductivity of pure silicon at room temperature when the concentration of carriers is 1.6×10^8 / cm^3. Given that μ_e = 1000 cm^2 / volt.sec and μ_h =1000 cm^2 / volt.sec. (3M)

PART -B

2. a) Define resolving power of a grating. Obtain an expression for resolving power of plane transmission grating. (8M)

   b) Explain electronic transport mechanism for LEDs. (8M)

3. a) Describe the construction and working of He-Ne laser with neat energy level diagram. (8M)

   b) What are the assumptions of classical free electron theory? Deduce an expression for electrical conductivity using this theory. (8M)

4. a) Prove that Meissner effect and disappearance of the resistivity in a superconductor are mutually consistent. (8M)

   b) State the Gauss's and Stokes theorems. Express the Maxwell's equations in differential form with explanation of their physical significance. (8M)

5. a) Discuss the important factors that affect the acoustics of an auditorium and methods to maintain good acoustics. (8M)

   b) Obtain an expression for the internal field using Lorentz method and hence derive Clasius-Mossotti equation. (8M)

6. a) Derive an expression for the wave function and energy of particle confined in a one-dimensional potential box using Schrodinger's wave equation. (8M)

   b) Explain salient points of BCS theory to explain superconductivity. (8M)

7. a) Derive an equation for the charge carrier concentration of conduction band of an intrinsic semiconductor. (8M)

   b) Explain half wave plate and quarter wave plate and derive the thickness of these plates. (8M)
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