Code No: R13103 **R13** SET - 1

I B. Tech I Semester Supplementary Examinations, December- 2021
ENGINEERING PHYSICS
(Com. to ECE, EEE, EIE, Bio-Tech, E Com E, Agri E)

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 the phenomenon of double refraction. (3M)
   b) Calculate the numerical aperture and acceptance angle of an optical fibre from the following data μ_1(core) = 1.60 and μ_2(cladding) = 1.59. (4M)
   c) Discuss DC Josephson effect. (4M)
   d) State and explain Eyring's formula. (4M)
   e) Explain the concept of effective mass of an electron. (3M)
   f) Define drift and diffusion currents in a semiconductor. (4M)

PART -B

2. a) How will you determine the refractive index of a liquid using Newton's rings experimental set-up? (8M)
   b) Explain with neat diagram, the construction and working of a solar cell. State few disadvantages of solar cell. (8M)
3. a) What is an optical fibre? What do you mean by numerical aperture of an optical fibre? Find an expression for the numerical aperture of a step index optical fibre. (8M)
   b) Discuss the motion of an electron in a periodic potential. With the help of energy band diagrams classify solids into conductors, insulators and semiconductors. (8M)
4. a) What is dielectric breakdown? Summarize the various factors contributing to breakdown in dielectrics. (8M)
   b) State Gauss and Stokes theorems. Explain how they are helpful in expressing basic laws of electromagnetism in differential form. (8M)
5. a) State and explain Sabine's formula. Derive Sabine's formula for reverberation time. (8M)
   b) With the help of magnetization curves explain Type I and Type II superconductors. (8M)
6. a) Write down Schrodinger's equation for a particle enclosed in a one dimensional box of infinite height. Solve it for eigen values and eigen functions. (8M)
   b) Define the terms co-ordination number and packing factor for cubic crystals. Obtain their values for SC, BCC and FCC lattices. (8M)
7. a) Derive an expression for density of electrons in the conduction band of an intrinsic semiconductor. (8M)
   b) Define resolving power of a plane diffraction grating. Obtain an expression for the resolving power of a grating. (8M)
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