

I B. Tech II Semester Supplementary Examinations, April/May - 2019
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**

PART -A

1. a) Define resolving power. Explain Rayleigh's criterion for it. (4M)
- b) Differentiate type-I superconductors from type-II superconductors. (4M)
- c) The spacing between principle planes of NaCl crystal is 2.82 \AA . It is found that first order Bragg reflection occurs at angle of 10° . What is the wavelength of X-rays? (3M)
- d) State the Stoke's and Gauss's theorems. (4M)
- e) Explain limitations of quantum free electron theory. (4M)
- f) Discuss conductivity of a semiconductor. (3M)

PART -B

2. a) Derive an expression for the radius of the n^{th} dark ring of Newton's rings. Explain why the rings are circular and the center of ring is dark in reflected system. (8M)
- b) Discuss electronic transport mechanism for solar cells. (8M)
3. a) Explain the term population inversion in a laser. Discuss the any two methods to achieving it. (8M)
- b) Explain Fermi-Dirac distribution function. Explain how it varies with temperature with the help of plots. (8M)
4. a) Calculate the number of atoms, atomic radius, coordination number and atomic packing fraction for BCC and FCC structures. (8M)
- b) Express the Maxwell's equations in integral form with explanation of their physical significance. (8M)
5. a) State and explain Sabine's formula for reverberation time of a hall. Derive Sabine's formula for reverberation time. (8M)
- b) What is Hysterisis? Explain the phenomenon of hysteresis in ferromagnetic materials and its significance. (8M)
6. a) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential. (8M)
- b) Derive an expression for numerical aperture and acceptance angle of an optical fibre. (8M)
7. a) Explain Hall effect and derive an expression for Hall coefficient in semiconductors. (8M)
- b) Explain phenomenon of double refraction. Discuss quarter and half wave plates. (8M)