

I B. Tech I Semester Supplementary Examinations, April - 2022**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 **ALL** the questions in **Part-A** is Compulsory
3. Answer any **THREE** Questions from **Part-B**

PART - A

1. a) State the superposition theorem. (3M)
- b) Explain the principle of an optical fibre. (4M)
- c) State and explain the modified Ampere's law. (4M)
- d) Describe any two factors of dielectric break down. (3M)
- e) Define relaxation time and mobility of charge carriers. (4M)
- f) Explain the electronic transport mechanism of a solar cell. (4M)

PART - B

2. a) Explain the theory of plane transmission grating and derive equations for maxima and minima. (8M)
- b) What are the limitations of intrinsic semiconductors? Obtain an expression for the carrier concentration of holes in the valence band of p-type semiconductor. (8M)
3. a) Describe the construction and working of He-Ne laser with relevant energy level diagram. List out its advantages over a ruby laser. (8M)
- b) What is the Fermi energy function? Explain with the help of a diagram how it varies with the change of temperature. (8M)
4. a) Derive the London equations and explain how their solution explains the Meissner effect. (8M)
- b) Derive electromagnetic wave equation in free space. (8M)
5. a) State and explain Sabine's formula for the reverberation time of a hall. Derive Sabine's formula for reverberation time. (8M)
- b) Distinguish between Ferro, anti-Ferro and Ferrimagnetic materials in terms of susceptibility and its dependence on temperature. (8M)
6. a) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential. (8M)
- b) What is electronic polarization? Show that the electronic polarization depends on the volume of the constituent atom. (8M)
7. a) Explain the method of determining the bandgap of an intrinsic semiconductor in terms of conductivity. (8M)
- b) Define mobility and coefficient of diffusion of charge carriers. How are they related to each other? (4M)
- c) Explain the phenomenon of double refraction. (4M)