



**ACE**  
Engineering College  
(with a Difference in Excellence)

An AUTONOMOUS Institution

Question Paper Code:

PH202BS

ACE-R20

**Semester End Examination**  
**I B. Tech- II Semester Supplementary-June-2022**  
**APPLIED PHYSICS**  
(Common to EEE,CSE,IT,CSD )

Time: 3 Hours

Max. Marks: 70

H. T. No

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks
1.a)	Explain de Broglie's concept of matter waves and describe the Davisson and Germer experiment for the existence of matter waves.	9M
b)	Calculate the de Broglie wavelength for a beam of electrons whose energy is 45eV.	5M
2. a)	Discuss the motion of an electron in a periodic potential field and explain the formation of energy bands.	9M
b)	Write the conclusions given by Kronig-Penney model.	5M
3. a)	What is meant by diffusion and drift in carrier transport? Explain the various processes of carrier generation and recombination.	9M
b)	The following data are given for intrinsic germanium at 300K. $n_i=2.4 \times 10^{19}/m^3$ , $\mu_n=0.39m^2V^{-1}s^{-1}$ , $\mu_p=0.19m^2V^{-1}s^{-1}$ . Calculate the resistivity of the sample.	5M
4. a)	Explain the construction and working of a common base NPN transistor.	9M
b)	In a common base connection, $I_E=1.65mA$ , $I_C=0.65mA$ . Find $I_B$ .	5M
5. a)	What are photo diodes? Explain the construction and working of a PIN diode.	9M
b)	What is Fill factor of a solar cell? Give few applications of solar cells.	5M
6. a)	What is population inversion? Explain how it is achieved in a He-Ne laser along with its construction and working.	9M
b)	What are the applications of laser in engineering and technology?	5M
7. a)	Explain the principle behind the propagation of light through an optical fiber. With the help of a suitable diagram explain the structure and working of an optical fiber as a wave guide.	9M
b)	Differentiate between Step index and graded index optical fibers.	5M
8. a)	Derive an expression for the internal field in solids.	9M
b)	Distinguish between Ferroelectricity and Piezoelectricity.	5M