R22 Regulation

Subject Code:4B1AK

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

Applied Physics

(IT)

Maximum Marks: 60

Date:03.10.2023 **Duration: 3 Hours**

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x1M=10 Marks)

1a Define de-Broglie's hypothesis.
b What are Matter waves.
c What is a Semiconductor.
d Define drift velocity.
e What is intrinsic semiconductor.
f Define drift current.
g Distinguish between direct and indirect band gap semiconductors
h What is Piezo electricity.
i Define numerical aperture.
j Define quantum logic gate.

Part-B

Answer All the following questions. (5X10M=50Marks)

2 Derive the time dependent Schrodinger wave equation and explain the physical significance of wave function. [10]

OR

3 Explain the motion of the particle in infinite square well potential (1-D potential box). [10]
4 Explain the concept of effective mass of an electron. [10]

OR

5 Explain the origin of energy band formation and classification of materials into conductors, semiconductors and insulators. [10]
6 Derive an expression for the concentration of electrons in intrinsic semiconductor. [10]

OR

7 Define Hall effect? Derive an expression for Hall coefficient of a given semiconductor. [10]
8 Describe the construction and working of solar cell with the help of neat labeled diagram. [10]

OR

9 Define electronic polarization and obtain expression for electronic polarizability. [10]
10 Distinguish between step index and graded index fiber. [10]

OR

11 Explain about Bloch sphere representation with the help of neat labeled diagram. [10]