R22 Regulation *Subject code: 4B1AK*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B. Tech I Semester Supplementary Examinations, June 2024

Applied Physics

(Information Technology)

Maximum Marks: 60 Date:01.07.2024 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)			CO No.	Bloom Tx
1.	a	Explain the wave particle duality.	CO1	L2
	b	An electron is moving under a potential field of 15KV, calculate the wavelength of the electron waves.	CO1	L2
	c	Define the terms mobility and relaxation time.	CO2	L1
	d	State the importance of the energy band structures.	CO2	L1
	e	Discuss the P-Type and N-Type semiconductors.	CO3	L2
	f	What is meant by negative temperature co-efficient of resistance?	CO3	L2
	g	Define the photovoltaic effect.	CO4	L1
	h	State the Piezo-electricity.	CO4	L1
	i	Write the importance of the acceptance angle.	CO5	L1
	j	Define Qubit.	CO5	L1
		Part-B		
Answer All the following questions. (5X10M=50Marks)				
2		Derive an expression for Schroedinger time independent wave equation. [10M]	CO1	L3
		OR		
3		Explain the electron behavior which is kept in a potential well. [10M]	CO1	L2
4		Explain the concept of effective mass of an electron. [10M]	CO2	L2
		OR		
5		Discuss the Kronig-Penny model for the motion of an electron in a periodic potential. [10M]	CO2	L3
6		a) Define the Fermi energy. [2M] b) Write a detailed note on drift and diffusion concepts. [8M]	CO3	L1 L2

	OR		
7	a) Describe the effect of temperature and doping concentration on the Fermi-level in n-type semiconductor. [5M] b) What is meant by breakdown voltage? Discuss the V-I characteristics of a PN-junction diode. [5M]	CO3	L2 L2
8	a) With a neat sketch explain the construction and working of a LED. [5M] b) Explain in detail about the Piezo-electricity. [5M]	CO4	L2 L2
	OR		
9	a) Discuss the working of a solar cell and also mention its advantages in the modern society. [5M] b) What is meant by pyro-electricity and write its applications. [5M]	CO4	L2 L1
10	a) Discuss about the various parts of optical fiber. [5M] b) Explain the CNOT Qubit gate with truth table. [5M]	CO5	L1 L1
	OR		
11	a) Write a detail note on attenuation in optical fiber. [5M] b) Discuss the Bloch sphere representation with a neat diagram. [5M]	CO5	L2 L2