



R22 Regulation *Subject code: 4B2AN*
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
 (Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech II Semester Regular/Supplementary Examinations, June 2024

APPLIED PHYSICS
 (Common to CSE, CSE(AI&ML) & CSE(DS))

Maximum Marks: 60

Date: 02.07.2024 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 only 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)	Marks	CO	BT
1.	a.	State de-Broglie's hypothesis.	1	1	1
	b.	What is a wave function?	1	1	2
	c.	Define Fermi energy level.	1	2	1
	d.	Draw E-K diagram.	1	2	3
	e.	What do you understand by diffusion current?	1	3	2
	f.	How PN junction is formed?	1	3	1
	g.	What is photovoltaic effect?	1	4	2
	h.	Classify types of polarization mechanisms.	1	4	4
	i.	Illustrate basic principle of an optical fiber.	1	5	2
	j.	What is entanglement?	1	5	1
Part-B					
Answer All the following questions.		(5X10M=50 Marks)			
2	a.	What are matter waves? Explain its characteristic properties. [5]	5	1	2
	b.	Describe Davisson-Germer's experiment to support the existence of matter waves. [5]	5	1	2
OR					
3	a.	Explain Heisenberg's uncertainty principle with two illustrations. [5]	5	1	3
	b.	Derive an expression for Schrodinger time-independent wave equation. [5]	5	1	5
4	a.	Discuss the postulates and limitations of classical free electron theory. [5]	5	2	2
	b.	Give an account of the band theory of solids based on the Kronig-Penny model. [5]	5	2	3
OR					
5	a.	Explain the concept of effective mass of an electron. [5]	4	2	5
	b.	Describe classification of solids on the basis of band theory. [5]	6	2	4

6	a. Distinguish between intrinsic and extrinsic semiconductors with suitable examples. [5] b. Derive an expression for donor concentration in n-type semiconductor. [5]	5 5	3 3	4 5
OR				
7	a. Discuss working principle of p-n junction diode at various bias. [5] b. What is Hall effect? Derive an expression for Hall coefficient. [5]	5 5	3 3	2 3
8	a. Distinguish between direct and indirect band gap semiconductors. [5] b. Explain the principle and working of a light emitting diode. Mention its applications. [5]	5 5	4 4	4 5
OR				
9	a. Write a short note on Piezoelectricity and Ferroelectricity. [5] b. What are the characteristics of liquid crystals? How are they used in the construction of liquid crystal display devices? [5]	5 5	4 4	2 3
10	a. Explain the construction of optical fiber. [5] b. Obtain the expression for acceptance angle of an optical fiber. [5]	5 5	5 5	2 5
OR				
11	a. Explain the representation of quantum mechanical state using Dirac notation. [5] b. Write a short notes on single Qubit gates and multiple Qubit gates. [5]	5 5	5 5	3 2