



Indian in Character International in Excellence

**R22 Regulation** **Subject code: 4B1AB**  
**TKR COLLEGE OF ENGINEERING AND TECHNOLOGY**  
 (Autonomous, Accredited by NAAC with 'A+' Grade)

**B.Tech I Semester Regular/Supplementary Examinations, January 2024**  
**Engineering Physics**  
 (Common to CE, EEE & ECE)

**Maximum Marks: 60**

Date: 22.01.2024 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	State Bloch's theorem.	1	I
	b	State the uncertainty principle of Heisenberg.	1	I
	c	Why do we prefer extrinsic semiconductors than intrinsic semiconductors?	2	II
	d	Differentiate between direct and indirect bandgap semiconductors.	2	I
	e	Define dielectric constant.	3	II
	f	Write the applications of piezoelectric materials.	3	II
	g	A super conductor termed as a perfect diamagnetic. Why?	4	III
	h	Compare para and ferromagnetic materials.	4	II
	i	List the characteristics of Lasers.	5	I
	j	Mention the advantages of fiber optics.	5	II

**Part-B**

Answer All the following questions.		(5X10M=50Marks)		
2	Derive Schrodinger's time-independent wave equation for a free particle. [10]	1		IV
	OR			
3	Explain Kronig-Penney model of solids and discuss the theory leading to the concept of band structure of solids. [10]	1		V
4	Explain the structure, working principle, characteristics and advantages of LED. [10]	2		II
	OR			
5	Offer a theoretical description of the experimental method to determine the electrical conductivity of a semiconductor with special reference to Hall effect. [10]	2		IV
6	Give an account of different types of polarization mechanisms in dielectrics. [10]	3		III

	OR		
7	Write short notes on (a) superionic conductors and (b) solid fuel cells. [5+5]	3	I
8	Describe the domain theory of ferromagnetism and explain the hysteresis loop based on that. [10]	4	II
	OR		
9	a) Differentiate types of superconducting materials by their properties. [5] b) Write the applications of superconductors. [5]	4	II
10	Explain the construction and working of ruby laser. Mention its applications. [10]	5	II
	OR		
11	Discuss the losses in optical fiber. Write a brief note on the applications of optical fibers. [10]	5	III