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 2026

APPLIED PHYSICS

(IT)

Maximum Marks: 60 Date: 18.06.2026 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 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)		Marks	CO	BTL
1.a	What is expression for energy of one-dimensional potential box?	1M	1	L1
b	Explain the physical significance of wave function?	1M	1	L1
c	Define Fermi level.	1M	2	L1
d	State Bloch's theorem.	1M	2	L1
e	Define drift current.	1M	3	L1
f	State Hall Effect?	1M	3	L1
g	Mention the symbol of LED.	1M	4	L1
h	Explain the electric susceptibility.	1M	4	L1
i	Define attenuation in optical fiber?	1M	5	L1
j	What is superposition in quantum computing	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Derive the expression for Schrodinger time independent wave equation and explain the physical significance of the wave function.	10M	1	L2
	OR			
3	Describe Davisson and Germer's experiment in support of the existence of matter waves.	10M	1	L2
4	Derive an expression for density of states.	10M	2	L2
	OR			
5	Explain merits of Classical free electron theory. Derive an expression for electrical conductivity.	10M	2	L2
6	Derive an expression for the carrier concentration in a P-type semiconductor and explain the variation of Fermi level with temperature?	10M	3	L2
	OR			
7	What is Hall Effect? Obtain an expression for the Hall coefficient for a semiconductor.	10M	3	L2

8	Describe the construction and working of avalanche photo diode with neat diagram.	10M	4	L2
	OR			
9	Explain ferroelectric materials and piezoelectric materials? And mention examples and its applications.	10M	4	L2
10	Define acceptance angle. Derive an expression for numerical aperture of fiber.	10M	5	L2
	OR			
11	Explain the CNOT Qubit gate with truth table.	10M	5	L2