R20 Regulation *Subject code:3B1AL*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B. Tech I Semester Supplementary Examinations, June 2026

APPLIED PHYSICS

(ECE)

Maximum Marks: 70 Date: 20.06.2026 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 (10X2M=20 Marks)		Marks	CO	BTL
1	Explain mean free path and write an expression for it.	2M	1	L1
2	Define density of states.	2M	1	L1
3	Distinguish conductors, semiconductors and insulators based on energy band diagram.	2M	2	L1
4	What is drift and diffusion currents?	2M	2	L1
5	What is mean by photovoltaic effect?	2M	3	L1
6	Explain Optical loss and Gain.	2M	3	L1
7	What is a direct and indirect band gap semiconductor?	2M	4	L1
8	What is a quantum dot?	2M	4	L1
9	Write the difference between PIN and Avalanche photo diodes.	2M	5	L1
10	What is the working principle of a Solar cell?	2M	5	L1
	Part-B			
Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Explain classical free electron theory and obtain expression for conductivity of a metal.	10M	1	L2
	OR			
12	Explain Kronig-Penny model.	10M	1	L2
13	Calculate the carrier concentration in intrinsic semiconductor.	10M	2	L2
	OR			
14	What is Hall effect? Derive an expression for Hall Voltage?	10M	2	L2
15	Explain about Joint density of states of photons.	10M	3	L2
	OR			
16	Explain about different types of Hetero structures	10M	3	L2
17	Explain the structure and working of homo junction semiconductor laser	10M	4	L2
	OR			
18	What is semiconductor diode laser? Explain its construction and working?	10M	4	L2
19	What is PIN photo diode? Explain structure and working of PIN photo	10M	5	L2

	diode.			
	OR			
20	What is solar cell, Explain I-V characteristics of a solar cell?	10M	5	L2