R20 Regulation *Subject code:3B2AF*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B. Tech II Semester Supplementary Examinations, June 2026

APPLIED PHYSICS

(Common to EEE, CSE, IT, CSE(AI&ML) & CSE(DS))

Maximum Marks: 70 Date: 17.06.2026 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	Define the terms relaxation time and mean free path.	2M	1	L1
2	What is effective mass.	2M	1	L1
3	Draw the diagram of dependence of Fermi level on temperature in N-type Semi-conductors.	2M	2	L1
4	Distinguish between drift and diffusion currents.	2M	2	L1
5	What are different types of optical transitions in bulk semiconductors?	2M	3	L1
6	Define Photo electric effect.	2M	3	L1
7	What is injection Electro Luminescence?	2M	4	L1
8	Draw the symbol of LED.	2M	4	L1
9	What is photo detector?	2M	5	L1
10	Define solar cell efficiency.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Explain Quantum free electron theory and obtain expression for resistivity of a metal.	10M	1	L2
	OR			
12	Explain Kronig-Penny model.	10M	1	L2
13	Explain the optical transitions in bulk semiconductor (absorption, spontaneous emission and stimulated emission) and deduce the relation between Einstein's coefficients.	10M	2	L2
	OR			
14	What is Hall effect? Derive an expression for Hall Coefficient.	10M	2	L2
15	Explain types of band gap modification in semiconductor materials for Opto electronic devices.	10M	3	L2
	OR			
16	What are optical joint density states? Derive expression for optical	10M	3	L2

	joint density of states.			
17	a) What is the basic principle of working of LEDs. b) Calculate the band gap energy of a semiconductor whose output wavelength is 1.86μm in eV.	5M 5M	4	L2
	OR			
18	What are Quantum wire based lasers? Explain.	10M	4	L2
19	Mention the general properties of semiconductor photo detectors and explain their uses.	10M	5	L2
	OR			
20	Explain the construction and working of Avalanche Photo diode.	10M	5	L2