R20 Regulation *Subject code:3B2AF*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B. Tech II Semester Supplementary Examinations, January 2026

APPLIED PHYSICS

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

Maximum Marks: 70 Date: 20.01.2026 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 the terms relaxation time and mean free path.	2M	1	L2
2	What are the drawbacks of Classical free electron theory?	2M	1	L1
3	Draw the diagram of dependence of Fermi level on temperature in P-type Semi-conductors.	2M	2	L1
4	What is drift and diffusion currents?	2M	2	L1
5	What are different types of optical transitions in bulk semiconductors	2M	3	L1
6	Write any two applications of Solar cells.	2M	5	L1
7	What is injection Electro Luminescence?	2M	4	L1
8	Write the different types of Laser Diodes.	2M	4	L1
9	What is photovoltaic effect?	2M	3	L1
10	Mention two applications of PIN diodes?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	a) Explain and derive an expression for Density of states. b) Explain and derive an expression for Effective mass with neat diagram	5M 5M	1	L2
	OR			
12	What is PN Diode? Explain the construction working and I-V characteristics of PN diode.	10M	1	L2
13	Calculate the carrier concentration in N type semiconductor.	10M	2	L2
	OR			
14	What is Hall effect? Derive an expression for Hall Coefficient?	10M	2	L2
15	Derive expression for density of states of photons.	10M	3	L2
	OR			
16	What are optical joint density states? Derive expression for optical joint density of states.	10M	3	L2

17	What are direct & indirect band gap semiconductor?	10M	4	L2
	OR			
18	a) Calculate the band gap energy of GaAsP semiconductor whose output wavelength is 6715A°. b) Distinguish between quantum well, wire and dot-based lasers.	4M 6M	4	L2 L4
19	Mention the general properties of photo detectors and explain types of semiconductor photo detectors?	10M	5	L2
	OR			
20	Explain the construction and working of PIN diode.	10M	5	L2