



R22 Regulation

Subject code:4B1AK

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech I Semester Supplementary Examinations, July 2025

APPLIED PHYSICS

(IT)

Maximum Marks: 60

Date:16.07.2025

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 are matter waves?	1M	1	L1
b	Write the physical significance of wave function?	1M	1	L1
c	Define mean free path.	1M	2	L1
d	What is Fermi energy level?	1M	2	L1
e	State Hall effect.	1M	3	L1
f	Draw the energy band structure of n-type semiconductor?	1M	3	L1
g	What is solar cell?	1M	4	L1
h	What is Luminescence?	1M	4	L1
i	Define Numerical aperture.	1M	5	L1
j	What is quantum entanglement?	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Estimate the energy of a particle in one dimensional potential box.	10M	1	L2
OR				
3	a) Derive the expression for de Broglie wavelength. b) Explain the properties of matter waves.	6M 4M	1	L2
4	a) What are the postulates of classical free electron theory? b) Derive an expression for electrical conductivity in a metal by using classical free electron theory.	4M 6M	2	L2
OR				
5	a) Describe the salient features of Kronig penny model. b) Explain the E-K diagram.	5M 5M	2	L2
6	a) Explain the formation of p-n junction. b) Draw the V-I characteristics of p-n junction diode.	7M 3M	3	L2
OR				
7	Discuss Fermi level variation in P-type semiconductor with charge carrier concentration and temperature.	10M	3	L2

8.	Describe the construction and working mechanism of LED.	10M	4	L2
	OR			
9	a) What is dielectric material? Mention the uses of dielectric materials? b) Define the terms (i) Dielectric Polarization (ii) Polarisability (iii) Spontaneous polarization	5M 5M	4	L2
10	a) Compare step index & graded index fiber. b) Derive an expression for acceptance angle of optical fiber.	5M 5M	5	L2
	OR			
11	a) Define bit and qubit. b) Explain the single qubit gate and multiple qubit gate.	2M 8M	5	L2