Code No: 181AA **R22**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech I Year I Semester Examinations, March/April - 2023

APPLIED PHYSICS

(Common to CE, ME, ECE, EIE, AE, BT, MIE, PCE, CSE(AI&ML), CSE(IOT), AI&DS, AI&ML)

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.
- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART- A

(10 Marks)

1.a)	What is blackbody?	[1]
b)	Define Symmetry in solids	[1]
c)	State Hall effect.	[1]
d)	List out applications of BJT.	[1]
e)	State pyroelectric.	[1]
f)	What are the applications of Energy Materials?	[1]
g)	Define Nano.	[1]
h)	Illustrate applications of nanomaterials.	[1]
i)	What is acronym LASER?	[1]
j)	What is total internal reflection?	[1]

PART - B

(50 Marks)

2.a)	Explain Stefan-Boltzmann's law.	
b)	Discuss Born interpretation of the wave function.	[5+5]
	OR	
3.a)	List out assumptions of Drude & Lorentz free electron theory.	
b)	Explain Fermi-Dirac distribution of electrons.	[5+5]
4.a)	Explain working principle of Zener diode.	
b)	Illustrate working mechanism of PIN diode in forward and reserve bias.	[5+5]
	OR	
5.a)	With a neat diagram, describe working principle of Avalanche Photo Diode (APD).	
b)	Distinguish between intrinsic and extrinsic semiconductors.	[5+5]
6.a)	What is ferroelectricity? Explain properties of ferroelectric materials.	
b)	Write a note on bubble memory devices.	[5+5]

OR

7.a) Write a note on multiferroics.
b) Explain construction and working principle of rechargeable ion batteries. [5+5]

8.a) Explain quantum confinement phenomenon.
b) Discuss fabrication of nanomaterials using Physical Vapor Deposition (PVD). [5+5]

OR

9.a) Write a note on combustion methods.
b) Discuss surface to volume ratio in nanomaterials. [5+5]

10.a) Describe construction and working mechanism of Nd:YAG laser.
b) Write a note on optical fiber for communication system [5+5]

OR

11.a) Discuss construction and working principle of Argon ion Laser.
b) Derive an expression for acceptance angle numerical aperture. [5+5]

--ooOoo--