Course Name: Engineering Physics

Course Outcomes (CO):

At the end of this course, the students will be able to:

1. Learn the principles of physical optics and understand their applicability in daily life.
2. Apply concept of physical optics to understand working of Lasers and optical fiber based communication systems.
3. Comprehend the properties of electromagnetic waves with electric and magnetic behavior of materials.
4. Understand the behavior of microscopic objects using fundamentals of quantum mechanics.
5. Apply and designing of various electronic devices using semiconductor physics.

Sub. Code: AHT 001 **Roll No. …….**

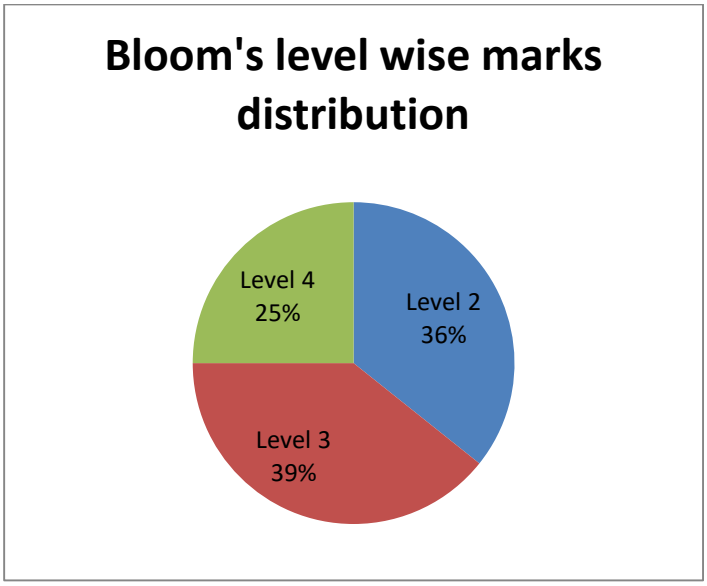
I SEMESTER EXAMINATION, 2022-23
I Year, B.Tech.
ENGINEERING PHYSICS

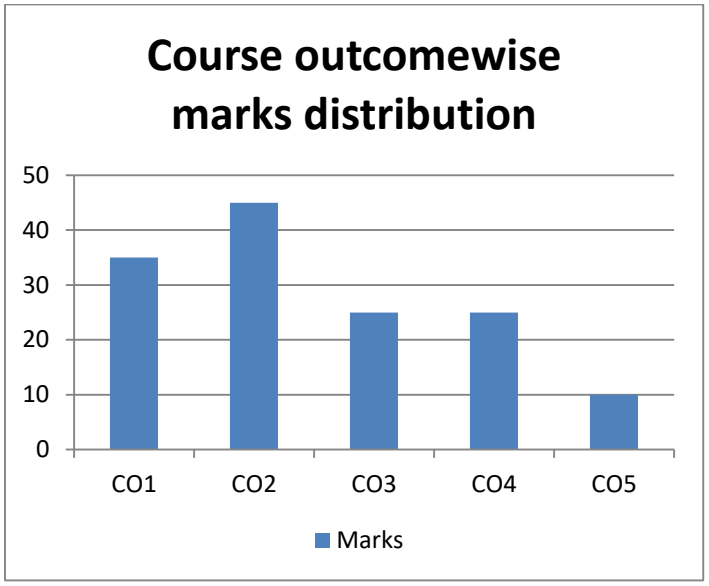
Duration: 3:00 hrs. **Max. Marks: 100**

Note:- Attempt all questions. All questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q.No	Questions	Marks	CO	BL	
Attempt any four parts of the following					
1a)	Explain V-I characteristics of p-n junction diode.	5	CO5	L2	
1b)	Derive Continuity equation from Maxwell's IV equation.	5	CO3	L3	
1c)	With the help of ray diagram explain construction and working of He-Ne laser.	5	CO2	L2	
1d)	Explain the conditions of sustained and well visible interference pattern.	5	CO1	L2	
1e)	Explain construction and working of solar cell.	5	CO5	L2	
Attempt any four parts of the following					
2a)	The distance between the slit and biprism and that between the biprism and screen are each 50 cm. The obtuse angle of biprism is 179^0 and its refrective index is 1.5. If the width of the fringes is 0.0135 cm, calculate the wavelength of light.	5	CO1	L4	
2b)	Calculate the angle at which the first dark band and the next bright band are formed in the Fraunhofer diffraction pattern of a slit 0.3 mm wide? Wavelength of the light used is 5890 A^0.	5	CO1	L4	

2c)	In a Compton scattering experiment, X-ray of wavelength 0.015 A^0 is scattered at 60^0. Find the wavelength of the scattered X-ray.	5	CO4	L4	
2d)	Calculate the thickness of a doubly refracting crystal plate required to introduce a path difference of $\lambda/2$ between ordinary and extraordinary rays when $\lambda = 6000$ A^0, $\mu_0 = 1.55$ and $\mu_e = 1.54$.	5	CO2	L4	
2e)	Calculate the numerical aperture, acceptance angle and the critical angle of a fiber having core refractive index 1.5 and the cladding refractive index 1.45.	5	CO2	L4	
Attempt any two parts of the following					
3a)	Describe and explain the formation of Newton's rings in reflected monochromatic light. Also derive the expression for the diameter of n^{th} dark and bright ring.	10	CO1	L2	
3b)	What do you mean by diffraction of light. Derive the expression for the intensity of principal and secondary maxima in case of Fraunhofer diffraction due to N parallel slit.	10	CO1	L2	
3c)	Explain properties of the diamagnetic substances. Also explain Langevin's theory of diamagnetism.	10	CO3	L3	
Attempt any two parts of the following					
4a)	Calculate the energy eigen value and normalized wave function for the particle in a one dimensional box problem.	10	CO4	L4	
4b)	What is wave function. Derive the time dependent Schrodinger wave equation by using time independent Schrodinger wave equation.	10	CO4	L3	
4c)	Explain spontaneous and stimulated emission of radiation and derive the relation between Einstein's A and B coefficients.	10	CO2	L3	
Attempt any two parts of the following					
5a)	What is meant by optical rotation. Explain Fresnel's theory of optical rotation.	10	CO2	L3	
5b)	Explain acceptance angle acceptance cone also determine the expression for acceptance angle in case of optical fiber.	10	CO2	L2	
5c)	What is Poynting vector. Derive and explain Poynting theorem.	10	CO3	L3	





BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 –Evaluating, 6 - Creating)
CO – Course Outcomes PO – Program Outcomes;