



NARASIMHA REDDY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad

Accredited by NAAC with A Grade, Accredited by NBA

B.TECH FIRST YEAR

QUESTION BANK

Course Title : APPLIED PHYSICS

Course Code : AP1102BS

Regulation : NR23

Course Objectives:

1. Students will demonstrate skills in scientific inquiry, problem solving and laboratory techniques.
2. Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics, Fiber optics and lasers, Semiconductor physics and Electromagnetic theory and a broad base of knowledge in physics.
3. The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.
4. To study applications in engineering like memory devices, transformer core and superconductors.

UNIT-I

Principles of Quantum Mechanics

S.No	Questions	BT	CO	PO
Part – A (Short Answer Questions)				
1	What is photo electric effect.	L2	1	1,2 ,3
2	What is black body radiation?	L2	1	1,2 ,3
3	What is dual nature of matter?	L3	1	1,2 ,3
4	What is Heisenberg uncertainty principle?	L1	1	1,2 ,3

5		What are the types of solids ?	L2	1	1,2,3
6		Explain Blochs theorem	L2	1	1,2,3
Part – B (Long Answer Questions)					
1	a)	Discuss about Photo Electric effect	L2	1	1,2,3
	b)	Explain Blochs theorem	L2	1	1,2,3
2	a)	Derive Plancks radiation law ?	L3	1	1,2,3
3	a)	Derive Schrodinger 1-D wave equation	L2	1	1,2,3
	b)	Discuss Born's interpretation of the wave length.	L2	1	1,2,3
4	a)	Describe the Davisson and Germer's experiment for verification of matter waves.	L2	1	1,2,3
	b)	Explain kronig penny model?	L3	1	1,2,3
5	a)	What is E K diagram	L1	1	1,2,3
	b)	Estimate the energy of a particle in 1-D potential box.	L2	1	1,2,3
6	a)	For an electron in a one-dimensional infinite potential well of width $1A^0$, calculate the energy separation between the two lowest energy level and also calculate the frequency and wavelength of phonon corresponding to a transition between these two levels.			

UNIT-II
UNIT NAME

S.No	Questions	BT	CO	PO
Part – A (Short Answer Questions)				
1	What are donors and acceptors? Give two examples each.	L2	2	1,2,3
2	Explain the concept of Hall effect.	L2	2	1,2,3
3	What are intrinsic and extrinsic semiconductors?	L3	2	1,2,3
4	What is Fermi level	L1	2	1,2,3
5	What are direct and indirect band gap semi conductors?	L2	2	1,2,3
6	What are uses of LED?			
7	Draw circuit diagram for PNP and NPN Transistor			

Part – B (Long Answer Questions)					
1	a)	Explain P N junction diode	L2	2	1,2,3
	b)	Evaluate I-V characteristics of P N diode.	L2	2	1,2,3
2	a)	Derive an expression for Hall coefficient	L3	2	1,2,3
	b)	Distinguish between n-type and p-type semiconductors.	L1	2	1,2,3
3	a)	What is a Zener diode? Discuss the V-I characteristics	L2	2	1,2,3
	b)	Explain Hall effect? Derive the formula to determine Hall coefficient and mobility of electrons.	L2	2	1,2,3
4	a)	Explain working principle of LED in detail.	L2	2	1,2,3
	b)	What are applications of LED	L3	2	1,2,3
5	a)	Explain working principle of SOLAR CELL in detail.	L1	2	1,2,3
	b)	What are applications of SOLAR CELL	L2	2	1,2,3
6	a)	Explain construction of photo diode			
	b)	What is Avalanche photo diode			

UNIT-III

Dielectric and Magnetic Properties

S.No	Questions		BT	CO	PO
Part – A (Short Answer Questions)					
1		What is Piezoelectric effect	L2	3	1,2,3
2		Explain dielectric constant and electrical susceptibility	L2	3	1,2,3
3		Distinguish between Ferro- electricity and Piezoelectricity	L3	3	1,2,3
4		Explain Ferro magnetism	L1	3	1,2,3
5		What is electronic polarization	L2	3	1,2,3
6		What is an internal field in dielectrics? Explain.			
7		Derive the relation between B, H and M			
Part – B (Long Answer Questions)					
1	a)	Explain in detail the classification of magnetic materials	L2	3	1,2,3

	b)	Describe the Hysteresis behavior of ferromagnetic material.	L2	3	1,2,3
2	a)	What are the differences between soft and hard magnetic materials?	L3	3	1,2,3
	b)	Derive an expression for Clausius Mosotti relation	L1	3	1,2,3
3	a)	Obtain an expression for the internal field seen by an atom in an infinite array of atoms subjected to an external field.	L2	3	1,2,3
	b)	Write a note on domain theory of ferromagnetism			
4	a)	What is dielectric polarization? Describe briefly types of polarizations?			

UNIT-IV

NANO TECHNOLOGY

S.No	Questions		BT	CO	PO
Part – A (Short Answer Questions)					
1		What is origin of nano technology?	L2	4	1,2,3
2		What are Nano materials ? give examples	L2	4	1,2,3
3		Why do nano materials exhibit different properties?	L3	4	1,2,3
4		Write advantages of TEM	L3	4	1,2,3
5		What are the applications of XRD	L3	4	1,2,3
Part – B (Long Answer Questions)					
1	a)	Explain the fabrication of nano particles by cvd method	L2	4	1,2,3
2	a)	.Explain the fabrication of nano particles by SOL-GEL	L3	4	1,2,3
3	a)	Explain the fabrication of nano particles by Pvd method	L2	4	1,2,3
4	a)	Discuss about TEM Technique to charaterise nano particles			

5	Discuss about SEM Technique to characterise nano particles			
6	Discuss about XRD Technique to characterise nano particles			

UNIT-V

Lasers & Fiber Optics

S.No	Questions	BT	CO	PO
Part – A (Short Answer Questions)				
1	Explain total internal reflection?	L2	5	1,2,3
2	Explain losses associated with optical fibers.	L2	5	1,2,3
3	Why population inversion is necessary for lasing action?	L3	5	1,2,3
4	What is population inversion in LASERS? How to achieve it.	L1	5	1,2,3
5	Explain spontaneous and stimulated emission of radiation with energy level diagram.	L2	5	1,2,3
6	Explain the term ‘numerical aperture’ and ‘acceptance angle’	L2	5	1,2,3
7	Write any two applications of optical fiber	L2	5	1,2,3
8	What is the importance of Step Index fiber?	L1	5	1,2,3
9	Define Acceptance Cone.	L2	5	1,2,3
10	An optical fiber having refractive indices of 1.6 and 1.59 for core and cladding respectively is placed in water of refractive index 1.33. Find the Numerical Aperture of the fiber.	L3	5	1,2,3
Part – B (Long Answer Questions)				
11	a) Write down the characteristics of Laser light.	L2	5	1,2,3
	b) Describe the construction and working of He-Ne laser with suitable diagrams.	L3	5	1,2,3
12	a) Explain the interaction of light radiation with matter and hence deduce Einstein coefficients.	L2	5	1,2,3
	b) Write applications of lasers in scientific and medical fields.	L3	5	1,2,3
13	a) Derive an expression for acceptance angle and numerical aperture.	L3	5	1,2,3
	b) Give an account of graded and step index fiber.	L3	5	1,2,3
14	a) Explain with neat diagram the principle and working of a Ruby laser.	L2	5	1,2,3
	b) Write the applications of optical fibers in sensor field.	L3	5	1,2,3
15	a) Discuss the losses associated with optical fibers.	L2	5	1,2,3
	b) Write the medical applications of optical fibers.	L3	5	1,2,3
16	a) Distinguish between step-index and graded index fibers with the help of refractive index profile.	L2	5	1,2,3
	b) Draw the block diagram of an optical fiber communication system and explain the function of each block.	L2	5	1,2,3

* **Blooms Taxonomy Level (BT)** (L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analyzing; L5 – Evaluating; L6 – Creating)

Course Outcomes (CO)

Program Outcomes (PO)

