



Parul University
Faculty of Engineering and Technology
Parul Institute of Engineering and Technology
Department of Applied Sciences and Humanities

Subject Name	Physics for Semiconductors	A.Y	2025-26
Subject Code	03019201BS01	Semester	2nd

Assignment

Sr No	Questions	COs	B.T	Competence
1	Explain total internal reflection principle.	2	1	Remember
2	Explain the significance of acceptance angle in fiber communication.	2	2	Understand
3	Which parameters are used to classify optical fibers?	2	1	Remember
4	List the various kinds of optical fibers along with diagram.	2	3	Apply
5	Describe difference between step-index and graded-index fibers.	2	1	Remember
6	Describe two types of losses in optical fibres	2	2	Understand
7	Describe a graded-index fiber and its benefits compared to step-index.	2	2	Understand
8	List three applications of PN junction photodiodes.	2	1	Remember
9	How does PIN diode improve sensitivity over PN diode?	2	1	Remember
10	List common uses of PIN photodiodes.	2	1	Remember
11	How does the effective mass of charge carriers influence their mobility?	1	3	Apply
12	Explain the difference between direct and indirect band gap semiconductors using E-k diagrams.	1	1	Remember
13	Direct or indirect band gap semiconductors, which semiconductors are preferred for designing electronic devices and why?	1	2	Understand
14	What is the difference between resistance and resistivity? Write the units of resistance and resistivity.	1	1	Remember
15	What are the limitations of resistivity-based classification?	1	2	Understand
16	What is an intrinsic semiconductor?	1	1	Remember
17	What is an extrinsic semiconductor?	1	1	Remember
18	Graphically demonstrate the position of Fermi level in intrinsic and extrinsic semiconductors.	1	3	Apply
19	Plot the I-V characteristics of Ohmic and Schottky junction.	1	3	Apply
20	How does the effective mass of charge carriers influence their mobility?	1	3	Apply
21	Define wave-particle duality with one example.	3	1	Remember

22	State Heisenberg's Uncertainty Principle in mathematical form.	3	1	Remember
23	Write the de Broglie wavelength equation for a moving particle.	3	1	Remember
24	What is meant by a well-behaved wave function?	3	2	Understand
25	Define probability density in quantum mechanics.	3	2	Understand
26	What is an operator in quantum mechanics? Give one example.	3	1	Remember
27	Differentiate between eigenfunction and eigenvalue.	3	3	Apply
28	Write the Time Dependent Schrödinger Equation (TDSE) in 1D.	3	2	Understand
29	State Postulate 1 of quantum mechanics.	3	1	Remember
30	Define wave-particle duality with one example.	3	2	Understand
31	Define nanomaterials and give one example.	4	1	Remember
32	Differentiate between Top down and bottom up approach.	4	2	Understand
33	Write any two examples of 0-D nanomaterials.	4	2	Understand
34	What is meant by surface area-to-volume ratio in nanomaterials?	4	1	Remember
35	Define carbon nanomaterials and give one example.	4	2	Understand
36	Explain the concept of quantum confinement in nanomaterials.	4	3	Apply
37	Write any two examples each of top down and bottom up approach.	4	3	Apply
38	Comment on optical properties of nanomaterials	4	3	Apply
39	What are the health hazards associated with nanomaterials	4	1	Remember
40	Explain, physical, electrical and optical properties of nanomaterials	4	2	Understand