Enrolment No/Seat No.: _____

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT

(An Autonomous Institute U/s UGC Act 1956)

B.Tech. SEMESTER-II, SEMESTER END EXAMINATION – WINTER 2025

SUBJECT CODE: 1SH206 **DATE: 05-01-2026**

SUBJECT NAME: FUNDAMENTAL OF SEMICONDUCTOR TECHNOLOGY

TIME: 11:00 AM to 01:30 PM **TOTAL MARKS: 70**

Instructions

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Write answers of **Section A** and **Section B** in **separate answer books**.
3. Attempt all questions from both **Section A** and **Section B**.
4. Each section carries **35 marks**, with a total of **70 marks** for the examination.
5. The figures to the right of each question indicate full marks, make suitable assumptions with justification.
6. BL - Bloom's Taxonomy Levels (R-Remember, U-Understanding, A –Application, N –Analyze, E – Evaluate, C -Create), CO - Course Outcomes.

SECTION A

		Marks	BL	CO
Q.1	**Multiple-Choice Questions**	**[05]**		
(a)	Which lithography technique is most commonly used in modern IC fabrication?	**1**	**R**	**3**
	(i) e-beam lithography **(ii)** X-ray lithography			
	(iii) Optical Lithography **(iv)** DPN lithography			
(b)	Types of Diffusion	**1**	**R**	**3**
	(i) Wet **(ii)** Dry			
	(iii) Vapor **(iv)** None of these			
(c)	Laser beam is highly coherent so it can be used in	**1**	**A**	**4**
	(i) Polarization **(ii)** Interference			
	(iii) Diffraction **(iv)** Rutherford Scattering			
(d)	A Laser light consist of	**1**	**A**	**4**
	(i) Cosmic ray **(ii)** Electron Beam			
	(iii) Light material particles **(iv)** Perfectly Coherent photons			

(e) Which of the following is a fundamental unit of quantum information.	**1**	**U**	**5**

(i) bit **(ii)** byte

(iii) quantum bit (qubit) **(iv)** quantum byte

Q.2 Attempt Any Two **[10]**

(a) List out step of Lithography technique and explain	**5**	**U**	**3**
(b) Write down short note on Oxidation.	**5**	**U**	**3**
(c) Explain in detail fabrication of PN junction.	**5**	**R**	**3**

Q.3 Attempt Any Two **[10]**

(a) Derive the relation between Einstein's Coefficient A & B.	**5**	**A**	**4**
(b) Explain Principle, construction and Working of Laser (CO_2 **OR** Nd:YAG) any one.	**5**	**R**	**4**
(c) Explain Characteristics LASER.	**5**	**R**	**4**

Q.4 Attempt Any Two **[10]**

(a) Write down difference between classical and quantum computer.	**5**	**U**	**5**
(b) Describe Moore's law and its application	**5**	**A**	**5**
(c) Write down application, advantage and disadvantage of quantum computing.	**5**	**R**	**5**

SECTION B

	Marks	BL	CO
Q.5 Multiple-Choice Questions	**[05]**		
(a) The smallest repeating unit in a crystal lattice is called a	**1**	**R**	**1**
(i) Molecule **(ii)** Bravais lattice			
(iii) Unit cell **(iv)** Basis			
(b) How many crystal systems are there in total?	**1**	**R**	**1**
(i) 3 **(ii)** 7			
(iii) 14 **(iv)** 21			
(c) According to the de Broglie hypothesis, every moving particle is associated with	**1**		**2**
(i) A sound wave **(ii)** A matter wave			
(iii) A light wave **(iv)** No wave			
(d) Heisenberg's Uncertainty Principle deals with the measurement of	**1**	**U**	**2**
(i) Position and momentum **(ii)** Mass and weight			
(iii) Color and shape **(iv)** Temperature and pressure			
(e) The de Broglie hypothesis relates particle momentum to which of the following?	**1**	**R**	**2**
(i) Energy **(ii)** Velocity			
(iii) Wavelength **(iv)** Frequency			
Q.6 Attempt Any Two	**[10]**		
(a) Define Crystalline and Amorphous solids with one example of each.	**5**	**U**	**1**
(b) Briefly explain the following terms: Lattice points, Space lattice, and Basis.	**5**	**U**	**1**
(c) Write a short note on crystal System.	**5**	**R**	**1**
Q.7 Attempt Any Two	**[10]**		
(a) Explain the physical significance of Schrodinger's Time-Independent Wave Equation.	**5**	**U**	**2**
(b) State the de Broglie Hypothesis.	**5**	**R**	**2**
(c) What was the main conclusion of the Davisson and Germer Experiment?	**5**	**R**	**2**

Q.8 Attempt Any Two **[10]**

(a) Explain the physical significance of the wave function.	**5**	**U**	**2**
(b) Calculate the Packing Factor for Simple Cubic (SC).	**5**	**R**	**1**
(c) Write a short note on Miller Indices	**5**	**R**	**1**

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