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: 1SH210	**DATE: 05-01-2026**
SUBJECT NAME: PHYSICS	
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) Band gap of silicon …   **1**   **U**   **2**

    (i) 1.1 eV   **(ii)** 0.3 eV

    (iii) 0.7 eV   **(iv)** 0.9 eV

(b) Full form of LED is …..   **1**   **R**   **2**

    (i) Light Emission Diode   **(ii)** Light Effect Diode

    (iii) Light Emitting Diode   **(iv)** Light Event Diode

(c) PN Junction diode operated in ….   **1**   **U**   **2**

    (i) Revesre bias condition   **(ii)** Forward bias condition

    (iii) Zero bias condition   **(iv)** open circuit condition

(d) full form of CNT is …..   **1**   **U**   **3**

    (i) Carbon neno tube   **(ii)** Carbon neon tube

    (iii) Carbon new tube   **(iv)** carbon nano tube

(e) Principle of Optical fiber is ….   1   R   5

    (i) Photo voltaic effect   **(ii)** Refraction

    (iii) Total internal reflection   **(iv)** Total internal refraction

Q.2 Attempt Any Two   [10]

(a) Describe Czochralski Process for crystal growth.   5   U   2

(b) Explain Construction and working of Zener diode.   5   U   2

(c) Write down application of solar cell in details.   5   R   2

Q.3 Attempt Any Two   [10]

(a) Discuss Sol gel method in detail   5   U   3

(b) Write down short note on Carbon Nano Tube.   5   R   3

(c) Discuss Application of nanomaterials in different field in details.   5   U   3

Q.4 Attempt Any Two   [10]

(a) Derive the relation between Einstein's Coefficient A and B.   5   A   5

(b) Discuss Construction and Working of Nd:YAG Laser   5   U   5

(c) Define Total Internal Reflection and write down application of Optical fibre.   5   U   5

SECTION B

Q.5 Multiple-Choice Questions [05]

(a) In P-type semiconductors, which one is the majority charge carriers? 1 R 1

    (i) Holes   (ii) Proton

    (iii) Electron   (iv) Neutron

(b) In_____a large energy gap exists between the valence band and the conduction band. 1 R 1

    (i) conductors   (ii) Insulators

    (iii) semiconductors   (iv) Metals

(c) In superconductivity, the electrical resistance of material becons_____ 1 U 4

    (i) Zero   (ii) Infinite

    (iii) Finite   (iv) none of the above

(d) Drift current is due to _____ 1 U 1

    (v) Applied electric field   (vi) Random motion of electrons

    (vii) Random motion of holes   (viii) Recombination of holes and electrons

(e) The superconducting state is perfectly_____ in nature. 1 R 4

    (v) Diamagnetic   (vi) Paramagnetic

    (vii) Ferromagnetic   (viii) Ferrimagnetic

Q.6 Attempt Any Two [10]

(a) Explain Properties of superconductor. 5 R 4

(b) Explain Type I and Type II Superconductor. 5 U 4

(c) Explain types of dielectric materials. 5 U 4

Q.7 Attempt Any Two [10]

(a) The critical temperature of Nb is 9.15 K. At zero Kelvin the critical field is 0.196 T. Calculate the critical field at 6 K. 5 A 4

(b) Short note on Fermi Level. 5 R 1

(c) Derive the concentration of holes in intrinsic semiconductor. 5 A 1

Q.8 Attempt Any Two [10]

    (a) Difference between Conductor, Semiconductor and Insulator.   **5**   **R**   **1**

    (b) Obtain fermi factor f(E) for energy 0.01 eV above fermi energy at 500 K.   **5**   **A**   **1**

    (c) Explain P-type and N-type semiconductors   **5**   **U**   **1**

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