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: 1SH209 **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)	As sound requires a medium, it cannot travel through which of the following?	**1**	**R**	**1**
	(i) Vacuum **(ii)** Glass			
	(iii) Water **(iv)** Air			
(b)	Which of the following has all the characteristics of a wave like amplitude, frequency, wavelength, phase and velocity?	**1**	**R**	**1**
	(i) Sound **(ii)** Air			
	(iii) Intensity **(iv)** Energy			
(c)	The unit of measurement of frequency is _____.	**1**	**R**	**1**
	(i) Hertz **(ii)** Second			
	(iii) Meter **(iv)** Unitless			
(d)	What causes reverberation?	**1**	**R**	**1**
	(i) Reflection **(ii)** Refraction			
	(iii) Diffraction **(iv)** Frequency			

(e) What is noise? **1** **R** **1**

(i) Undesirable and unwanted sound **(ii)** Desirable and unwanted sound

(iii) Undesirable and wanted sound **(iv)** Desirable sound

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

(a) List out application of Ultrasonic waves. **5** **R** **1**

(b) Define the following terms: **5** **R** **1**
1)Velocity, 2)Frequency, 3)Wavelength, 4)Intensity, 5)Loudness

(c) Write down classification of sound. **5** **R** **1**

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

(a) Discuss types of factures. **5** **R** **3**

(b) Explain Stress-Strain Curve with proper diagram. **5** **U** **3**

(c) A copper wire is stretched by 5% of its length. Determine the stress produced in the wire. (Given Y for copper is 1.2×10^{11} N/m^2) **5** **A** **3**

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

(a) Explain Hook's Law.. **5** **U** **3**

(b) A wire of length 1m extended by 1mm when stretched by the load of 1kg. find the area of cross section of the wire. Given that $g = 9.8$ m/s^2 and $Y = 2 \times 10^{11}$ N/m^2. **5** **A** **3**

(c) Derive the expression of the Bending moment for the circular beam. **5** **A** **3**

SECTION B

	Marks	BL	CO
Q.5 Multiple-Choice Questions	**[05]**		
(a) What does the 'S' in LASER stand for?	**1**	**R**	**2**
(i) Simple **(ii)** System			
(iii) Spontaneous **(iv)** Stimulated			
(b) In which of the following is a "Metastable state" found?	**1**	**R**	**2**
(i) Wood **(ii)** Solar cells			
(iii) Laser action **(iv)** Glass			
(c) Nanotechnology deals with materials at which length scale?	**1**	**R**	**5**
(i) Meters **(ii)** Nanometers			
(iii) Centimeters **(iv)** Kilometers			
(d) What is the Atomic Packing Factor (APF) for a Face-Centered Cubic (FCC) structure?	**1**	**U**	**4**
(i) 0.52 **(ii)** 0.74			
(iii) 0.68 **(iv)** 0.34			
(e) Which material is known for returning to its original shape after being deformed when heat is applied?	**1**	**U**	**5**
(i) Metallic Glass **(ii)** Nanomaterials			
(iii) Shape Memory Alloy **(iv)** Biomaterials			
Q.6 Attempt Any Two	**[10]**		
(a) Explain the construction and working principle of either the Nd:YAG Laser	**5**	**U**	**2**
(b) Derive the expression for energy density at thermal equilibrium.	**5**	**U**	**2**
(c) Explain the application of Laser.	**5**	**U**	**2**
Q.7 Attempt Any Two	**[10]**		
(a) Discuss the difference between crystalline and amorphous solids.	**5**	**U**	**4**
(b) State and explain Bragg’s Law of X-ray diffraction.	**5**	**U**	**4**
(c) Calculate the Packing Factor for Body-Centered Cubic (BCC).	**5**	**U**	**4**

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

(a)	Explain the principle, construction, and working of a p-n Junction Solar cell	**5**	**U**	**5**
(b)	Differentiate between a quantum dot, quantum wire, and quantum well.	**5**	**U**	**5**
(c)	Discuss the application of Metallic glass.	**5**	**U**	**5**

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