

R.N.G.PATEL INSTITUTE OF TECHNOLOGY-RNGPIT
(An Autonomous College U/s UGC Act 1956)

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

Subject Code: 1SH209

Date: 14-05-2025

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) Which law is also called as the elasticity law?

1 R 3

(i) Bernoulli's law

(ii) Stress law

(iii) Hooke's law

(iv) Poisson's law

(b) The property by which a body returns to its original shape after removal of the force is called _____

1 U 3

(i) Ductility

(ii) Malleability

(iii) Elasticity

(iv) Plasticity

(c) What is the unit of loudness level for pure tone?

1 R 1

(i) Decibel

(ii) Velocity

(iii) Phon

(iv) Wavelength

(d) What is the complete audible range for a human ear?

1 R 1

(i) 20 to 25,000 HZ

(ii) 20 to 30,000 HZ

(iii) 20 to 20,000 HZ

(iv) 20 to 50,000 HZ

(e) The dimension of strain is?	1	U	3
(i) LT^{-2}	(ii) N		
(iii) dimensionless	(iv) LT		

Q.2 Attempt Any Two	[10]		
(a) Describe Piezoelectric method for production of Ultrasonic waves.	5	R	1
(b) Define Reverberation and Reverberation time. Also describe remedies of Reverberation.	5	U	1
(c) The sound intensity received from a train is 25.3 W/m^2 and that of from another train is 0.9 W/m^2 . Find the resultant relative intensity of these two sources in decibel.	5	A	1
Q.3 Attempt Any Two	[10]		
(a) Explain classification of sound on the basis of frequency in detail. Also classify audible sound.	5	R	1
(b) A hall has volume of 7500 m^3 . What should be the total absorption in the hall if the reverberation time is 1.5 seconds is to be maintained?	5	A	1
(c) Define working stress. Discuss factor of safety.	5	U	3
Q.4 Attempt Any Two	[10]		
(a) Describe factors affecting elasticity in detail.	5	R	3
(b) Derive relation between Young's modulus, Bulk modulus and Poisson's ratio.	5	U	3
(c) A copper wire is stretched by 5% of its length. Determine the stress produced in the wire. (Young's modulus for copper is $1.2 \times 10^9 \text{ N/m}^2$)	5	A	3

SECTION B

	Marks	BL	CO
Q.5 Multiple-Choice Questions	[05]		
(a) What is the co-ordination number for BCC structure?	1	R	4
(i) 6			
(ii) 8			
(iii) 12			
(iv) 14			
(b) Which of the following is a characteristic of amorphous solid?	1	R	4
(i) They are true solids.			
(ii) They have sharp melting points.			
(iii) They are isotropic.			
(iv) They undergo clear cleavage.			
(c) Full Form of SMA	1	R	5
(i) Straight Metal Alloy			
(ii) Shape Memory Alloy			
(iii) Stress Memory Alloy			
(iv) Strain memory Alloy			
(d) Active medium of CO ₂ laser is _____	1	U	2
(i) CO			
(ii) Carbon			
(iii) CO ₂			
(iv) None of these			
(e) Which of the following is not a crystal system?	1	U	4
(i) Cubic			
(ii) Trigonal			
(iii) Hexaclinic			
(iv) Triclinic			
Q.6 Attempt Any Two	[10]		
(a) List out Properties of Laser and describe in detail.	5	R	2
(b) Prove the ratio of Einstein's coefficient is directly proportional to frequency cube (f^3).	5	U	2
(c) Describe, principle, construction and working of Nd: YAG Laser.	5	U	2
Q.7 Attempt Any Two	[10]		
(a) Derive atomic radius of BCC and FCC structure.	5	U	4
(b) A crystal of FCC structure has atomic radius of 1.2 \AA . Find out the volume of its unit cell.	5	A	4

(c) Find out packing factor of Body centered cubic structure.	5	A	4
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Q.8 Attempt Any Two	[10]
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(a) Describe the properties and application of SMA	5	R	5
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(b) Explain Melt Spinning process for the production of metallic glasses.	5	U	5
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(c) Explain quantum size effect of nanomaterials.	5	R	5
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