

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

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

Subject Code: 1PT203	Date: 13-05-2025
Subject Name: MATERIAL SCIENCE AND METALLURGY	
Time: 11:00 AM to 01:00 PM	Total Marks: 50

Instructions

1. It is **compulsory** for students to write **Enrolment No. /Seat No.** on the question paper.
2. Attempt all questions in the question paper.
3. The figures to the right of each question indicate full marks. Make suitable assumptions with proper justification wherever required.
4. Simple, non-programmable scientific calculators are permitted.
5. BL - Bloom's Taxonomy Levels (R-Remember, U-Understanding, A-Application, N-Analyze, E-Evaluate, C-Create), CO - Course Outcomes.

	Marks	BL	CO
Q.1 Multiple-Choice Questions	[05]		
(a) Which of the following is the property because of which a material can be drawn into wires?	1	R	1
(i) Ductility			
(ii) Elasticity			
(iii) Malleability			
(iv) Strength			
(b) Pearlite is a mixture of:	1	R	3
(i) Austenite and Cementite			
(ii) Ferrite and Cementite			
(iii) Ferrite and Austenite			
(iv) Austenite and Ledeburite			
(c) How many types of systems are applicable for phase diagrams?	1	R	2
(i) One			
(ii) Two			
(iii) Three			
(iv) Four			
(d) How is Gibb's phase rule defined?	1	R	2
(i) $C+P+1$			
(ii) $C+P+2$			
(iii) $C-P+2$			
(iv) $C-P$			
(e) Ultrasonic testing is done in materials to determines	1	R	5
(i) Cracks below the surface			
(ii) Yield strength			
(iii) Ultimate tensile strength			
(iv) Hardness			

Q.2 Attempt Any Three	[15]		
(a) Explain the following material properties: Ductility, Elasticity, Toughness, Hardness, Creep	5	R	1
(b) Discuss selection criteria for materials used in engineering Applications.	5	R	1
(c) Give the types of solid solution and explain anyone.	5	U	2
(d) What is Gibb's phase rule? Explain it with suitable example.	5	U	2
Q.3 Attempt Any Three	[15]		
(a) Draw iron- carbon diagram and explain Colling of 0.4 % carbon from austenite to room temperature.	5	R	3
(b) Draw cooling curves for pure metals, Binary solid solution and Eutectic system and explain anyone.	5	U	3
(c) What can you interpret from Phase diagram?	5	U	3
(d) Draw and explain cooling curve of pure metal iron.	5	U	4
Q.4 Attempt Any Three	[15]		
(a) Explain briefly Annealing process.	5	U	4
(b) Explain in brief TTT diagram.	5	U	4
(c) Explain advantages and disadvantages of Magnetic particle testing method.	5	A	5
(d) Describe Liquid Penetrant Testing Method.	5	U	5
