

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: IMSc
BRANCH: CHEMISTRY**

**SEMESTER : VI
SESSION : SP/2025**

SUBJECT: CH316 NOVEL INORGANIC SOLIDS

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	Compare and contrast the Sol-Gel method, Intercalation technique, and Hydrothermal synthesis in terms of their fundamental mechanisms, processing conditions, and suitability for fabricating nanostructured materials. Discuss the advantages and limitations of each method with relevant examples.	[5] 1	2
Q.1(b)	Compare and contrast annealing, quenching, and tempering. How does each process affect the mechanical properties of steel?	[5] 1	3
Q.2(a)	Draw and explain a typical hysteresis loop. Define and describe the significance of coercivity, retentivity, and saturation magnetization.	[5] 2	2
Q.2(b)	What are inorganic pigments? Discuss their classification based on composition and color. Provide examples of metal oxide-based pigments	[5] 2	1
Q.3(a)	Discuss about some important applications of gold nanoparticles.	[5] 3	1
Q.3(b)	What do you mean by self assembly? Explain the thermodynamics of self assembly. What are the major challenges of this process?	[5] 3	3
Q.4(a)	What is Valve steel? Discuss the classification of different carbon steel.	[5] 4	3
Q.4(b)	White the composition and properties of Phosphor bronze and silicon bronze. What is Gun metal?	[5] 4	2
Q.5(a)	Write short notes on (a) Carbon Fiber Reinforced Polymer Composites and (b) Aramid Fiber Reinforced Polymer Composites	[5] 5	1
Q.5(b)	What are refractory materials? Discuss their properties and applications.	[5] 5	2

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