Q.P. Code:13964

(3 Hours) **[Total Marks: 80]**

N. B. 1) Question No. 1 is compulsory.
2) Attempt any three questions from remaining five questions.
3) Figures at right indicate marks.
4) Draw neat well labeled sketches.

Q. 1		Write note on any four:-	(20)
	a)	Austempering	
	b)	Creep mechanism.	
	c)	Effect of Alloy on TTT diagram.	
	d)	Factors governing formation of substitutional solid solution.	
	e)	Thermal Fatigue	
Q. 2	A)	What do you mean by Nano-materials? Explain their properties and practical applications.	(7)
	B)	What is Fatigue? Explain fatigue testing in detail.	(7)
	C)	Explain Carburizing treatment.	(6)
Q. 3	A)	Draw Fe-Fe_3C Diagram and give all critical temperatures.	(7)
	B)	How dislocations are generated at Frank Reed Source? Explain dislocation Jog.	(7)
	C)	Explain general effect of alloying element on Fe-c dia and properties of material.	(6)
Q. 4	A)	Draw and explain construction of Time Temperature Transformation (TTT) diagram.	(7)
	B)	Derive an expression for Griffith theory of brittle fracture. Explain Orowan's Modification.	(7)
	C)	Explain Induction Hardening.	(6)
Q. 5	A)	What are the type's deformation? Explain mechanism of plastic deformation.	(7)
	B)	Classify crystal Imperfections. Explain Edge and Screw dislocation.	(7)
	C)	Explain creep test and Andrade's analysis of creep curve.	(6)
Q. 6		Write short note on any four	(20)
	a)	FCC to BCT conversion (Bain's model)	
	b)	Tempering	
	c)	Strain Aging	
	d)	Hardenability test	
	e)	Normalizing	
