Time: 3 Hour   Max. Marks: 80

===

N. B.
1) Question No.1 is compulsory.
2) Attempt any three questions from the remaining five questions.

Q1.		Solve any FOUR	[20]
	(a)	Explain various line crystal defects	
	(b)	What is fatigue? Draw SN curve for Ferrous and Non-Ferrous metals.	
	(c)	Explain flame hardening with advantages and limitations.	
	(d)	Explain Subzero Heat Treatment	
	(e)	Explain Eutectic Phase diagram	
Q2.	(a)	Discuss the effect of alloying elements on iron carbon diagram.	[10]
	(b)	What are the key characteristics of brittle materials? Derive an expression for Griffith's theory of brittle materials fracture.	[10]
Q3.	(a)	Draw & Explain TTT diagram for eutectoid steel.	[10]
	(b)	Draw $Fe-Fe_3C$ equilibrium diagram and label all the temperatures, compositions, and phases clearly. Also write invariant reactions.	[10]
Q4.	(a)	What are various types of heat treatment processes? Explain Full annealing process.	[10]
	(b)	What is mean by hardenability? Discuss the procedure of Jominy End Quench test to determine hardenability.	[10]
Q5.	(a)	Differentiate between brittle and ductile fracture.	[10]
	(b)	What are the various methods of processing composites? Explain any one of them?	[10]
Q6.	(a)	Differentiate between carburizing and nitriding process	[6]
	(b)	Classify stainless steels? Give the applications of each of them.	[6]
	(c)	Define creep. Draw classical creep curve. Explain each stage in detail	[8]

_____

28087   1