

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL (A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH. (MECHANICAL/IP ENGINEERING) END SEMESTER EXAMINATIONS, JUNE 2019

SUBJECT: HEAT TREATMENT OF METALS AND ALLOYS [MME 4006]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

* Answer **all** questions.

✤ Missing data may be suitably assumed.

1A.	Calculate the relative amount of ferrite and cementite in a steel containing 0.8 %	(3)
	carbon.	
1B.	Draw the neat labelled iron carbide equilibrium diagram and show all invariant	(3)
	reactions.	
1C.	What are austenite and ferrite stabilizers? Explain their effect on austenite region	(4)
	with neat sketches.	
2A.	What are the characteristics of martensite transformation?	(4)
2B.	Write a short note on homogenizing annealing and partial annealing.	(3)
2C.	Wat are the characteristics of Bainite transformation?	(3)
3A.	What is temper embrittlement? Explain its two types.	(3)
3B.	With neat sketches explain ausforming and isoforming.	(4)
3C.	Explain solid carburizing process with an example of chemical reaction.	(3)
4A.	Write a short note on white and gray cast iron.	(4)

4B.	With neat sketch, explain the process of malleableization of white cast iron.	(4)	
4C.	Write a short note on spheroidal graphite iron.	(2)	
5A.	Write a short note on heat treatment defects: Overheating, Burning, Decarburization and Erosion.	(4)	
5B.	Write a short note on:	(4)	
	(i) Martensite (ii) Pearlite (iii) Bainite (iv) Ledeburite		
5C.	Write a short note on dual phase steel.	(2)	
