Reg. No.



(A constituent unit of MAHE, Manipal)

VI SEMESTER B. TECH. (MECHANICAL / IP ENGG.) END SEMESTER MAKE UP EXAMINATIONS, JUNE 2018 SUBJECT: HAEAT TREATMENT OF METALS AND ALLOYS [MME 4006] **REVISED CREDIT SYSTEM**

Time: 3 Hours

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MAX. MARKS: 50

	Instructions to Candidates:	
	 Answer ALL the questions. Missing data may be suitable assumed 	
	• Wissing data may be suitable assumed.	
1A.	Sketch neatly the ideal Iron-Carbon equilibrium diagram, showing all the temperature points, compositions and phases.	4
1 B .	Write the characteristics of Martensitic transformation with relevant graphs.	3
1C.	Explain the following heat treatment defects.a) Oxidationb) Quench cracks	3
2A.	Explain the following heat treatment processes.a) Plasma nitridingb) Induction hardening.	4
2B.	Why TTT diagram is "C" shape? Explain with suitable graphs.	3
2C.	With the help of neat sketch explain progressive flame hardening process and also highlight the advantages of induction hardening over flame hardening.	3
3A.	What is age hardening? With the help of phase diagram briefly explain the conditions necessary for age hardening.	4
3B.	Give technical reasons for the following:a) Induction hardening is known as "Skin effect."b) Nitriding is always subcritical treatment.	3
3C.	Differentiate between Spherodizing and isothermal annealing.	3
4A.	With heat treatment cycle explain the post carburizing treatment for 1024 steel.	4
4B.	Name and explain the three different annealing treatments for grey cast iron.	3
4C.	Write a note on classification of stainless steels and their application.	3
5A.	 Write short notes on the following: a) Valve steel b) Structural steel c) Heat treatable aluminum alloys d) Temper embrittlement 	2x5=10