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II SEM. M.TECH. (ME) END SEMESTER EXAMINATIONS, APRIL 2019 SUBJECT: ADVANCED HEAT TREATMENT [MME 5268]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data may be suitably assumed.
- **1A.** "In nonferrous metals thermo-mechanical treatment (TMT) is given to age hardenable metals only." Justify the statement.

With heat treatment cycle, explain the following thermo-mechanical treatments for HSLA steel:

i) Ausforming

ii) Hot-cold working

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- **1B.** "Malleabilization treatment is given to white cast iron having microstructure totally free from free carbon." Why it is so? Explain.
 - With suitable heat treatment cycle explain the controlled annealing treatment for malleabilization of white cast iron.

C

- **2A.** "Iron –carbon equilibrium diagram is the fundamental for heat treatment of steels." Explain the statement.
 - Draw neatly Iron Carbon phase diagram and using this diagram find the composition of steel containing **60** weight percentage as pearlitic phase.
- **2B** "Isothermal diagram is generally C shape." Justify the statement.

Write short note on:

- i) Bainitic transformation ii) Characteristics of martensite transformation
- 5
- **3A.** "It is better to give post carburizing treatment on the coarse grained steel components." Justify the statement.
 - With heat treatment cycle explain the standard heat treatment for coarse grained steels.

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MME 5268 Page 1 of 2

3B.	"Tool steels require multiple tempering treatments." Explain the statement.						
	With suitable heat treatment cycle explain the standard heat treatment for tool						
	steel dies.	5					
4A.	"Induction hardening is known as skin effect." Explain the statement.						
	Explain the following:						
	i) Electrical steel ii) Austenitic stainless steel	5					
4B.	"Maraging steel has high strength, hardness and formability." Justify the						
	statement.						
	With suitable heat treatment cycle explain the standard heat treatment for						
	25% Ni – Maraging steel.						
5A.	"Nitriding is the last heat treatment to be given to the steel." Explain the						
	statement.						
	Write short notes on:						
	(i) Nitriding of 4310 steel. (ii) Flame hardening of 1340 steel	5					
5B.	"Age hardening requires sloping solvus solubility line in that alloy system."						
	Justify the statement. With part of phase diagram and heat treatment cycle						
	explain Age hardening treatment for Al7075 alloy.	5					

MME 5268 Page 2 of 2