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Exam Date & Time: 08-May-2024 (02:30 PM - 05:30 PM)



SIXTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2024 HEAT TREATMENT OF METALS AND ALLOYS [MME 4046]

Α

Answer all the questions.

Ins	tructions t	o Candidates: Answer ALL questions Missing data may be suitably assumed	
1)		You have a eutectoid plain carbon steel. Analyze how the addition of Cr and Ni influences the austenite region and provide clear sketches to illustrate.	(4)
	A)		
	B)	Calculate the relative amount of austenite and ledeburite in a cast iron containing 3 % carbon.	(3)
	C)	Illustrate the conclusions for kinetics of austenite formation.	(3)
2)		Which microstructure is formed due to the diffusion-controlled transformation? List its characteristics of transformation.	(3)
	A)		
	B)	Explain any three types of annealing treatment.	(3)
	C)	Reframe the Jominy (End Quench) hardness test, accompanied by a clear sketch, to demonstrate its use in measuring the hardenability of steel.	(4)
3)		Explain with neat sketch; Controlled Rolling and Hot-Cold Working.	
			(4)
	A)		
	B)	Which chemical case hardening treatment do you recommend for gears with a diameter of 300mm, and why? Please explain the treatment, including the relevant chemical equations.	(4)
	C)	Analyze the risks associated with non-usage of heat treatment techniques in automobile industry.	(2)
4)		Explain with the neat sketch: malleableization of white cast iron.	
')			(4)
	A)		
	B)	Explain with the neat sketch; heat treatment of high-speed steel	(4)

Duration: 180 mins.



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C)	What is the composition of AISI 5130 and AISI 2320 steels according to AISI steel numbering designation system.	(2)
5)	Explain the following heat treatment defects: warping, soft spots and black fracture.	(3)
A)		(3)
A)		
B)	Differentiate white cast iron and gray cast iron (minimum 6 points).	(3)
C)	Write a short note on a) Temper embrittlement, b) Allotropic behavior of iron, c) Spheroidite microstructure, d) Stainless steel.	(4)

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