

GOVERNMENT POLYTECHNIC JAJPUR

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DEPARTMENT OF METALLURGICAL ENGINEERING

LESSON PLAN

Discipline Metallurgy	Semester 5th	Name of teaching faculty: Suvendu Muduli lecturer in metallurgy	
<u>Subject</u> Heat Treatment Theory	<u>No day/ week class:</u> 4	SEMESTER FROM 01-08-2023 to 09-12-2023 No of week: 16 Session: Winter 2023	
Week	Class Day	Topic	
1st	1st	Introduction to heat treatment	
	2nd	Revision of iron carbon diagram	
	3rd	Solid state transformation	
	4th	Discuss about diffusion	
2nd	1st	Explain Fick's law	
	2nd	Mechanism of austenite formation	
	3rd	Austenite grain size	
	4th	Methods of grain size measurement	
3rd	1st	Control of grain size	
	2nd	Discuss pearlite transformation	
	3rd	Discuss bainite transformation	
	4th	Discuss martensite transformation	
4th	1st	Draw T.T.T curve	
	2nd	Explain T.T.T curve	
	3rd	Draw C.C.T curve	
	4th	Explain C.C.T curve	
5th	1st	Compare between T.T.T and C.C.T curve	
	2nd	T.T.T curve for hypo and hyper eutectoid steel	
	3rd	Purpose of heat treatment	
	4th	Types of heat treatment	
	1st	Discuss annealing method	
	2nd	Explain normalising method	

6th	2nd	
	3rd	Revision of old chapter
	4th	Class test-1 m.c.q type
7th	1st	Discuss hardening method
	2nd	Factors affecting hardening method
	3rd	Different quenchants and application
	4th	Discuss stages of tempering
8th	1st	Different thermo-mechanical treatment of steel
	2nd	Discuss martempering
	3rd	Discuss austempering
	4th	Explain sub-zero treatment
9th	1st	First I.A test
	2nd	Discuss hardenability
	3rd	Explain jominy end quench test
	4th	Discuss Grossmans method
10th	1st	Compare hardness and hardnability
	2nd	Fracture test and chemical composition test
	3rd	Factors affecting hardenability
	4th	Case hardening method
11th	1st	Discuss flame hardening method
	2nd	Explain induction hardening method
	3rd	Discuss laser beam hardening
	4th	Measurement of case depth
12th	1st	Discuss solid carburising
	2nd	Discuss liquid carburising
	3rd	Class test-2 m.c.q type
	4th	Discuss gas carburising
13th	1st	Explain vacuum carburising
	2nd	Define nitriding
	3rd	Explain cyaniding
	4th	Discuss carbonitriding
14th	1st	Discuss plasma nitriding
	2nd	Discuss salt bath nitro-carburising
	3rd	Principle of boronising

	4th	Principle of chromising
15th	1st	Explain Toyota diffusion method
	2nd	Explain post carbonising treatment
	3rd	Principle of age hardening
	4th	Precipitation method of Al-Cu alloy
16th	1st	Heat treatment of die steel and alloy steel etc.
	2nd	Effect of alloying elements in heat treatment of steel
	3rd	Revision of old chapter
	4th	Second I.A test