

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (NEW) EXAMINATION - WINTER 2018

Sub	ject	Code:2152106 Date:27/1	1/2018
Subject Name:Physical Metallurgy Time: 10:30 AM TO 01:00 PM Instructions: Total Marks:			rks: 70
			1115. 70
	1. 2.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
			MARKS
Q.1	(a)	Write important features of Miller Indices.	03
	(b)	Define Miller indices. Draw following planes in cubic system (123) (001) (100).	04
	(c)	Draw Iron –iron carbide equilibrium diagram indicating all important temps, phases, and compositions.	07
Q.2	(a)	Draw following directions in cubic system [100] [010] [111]	03
	(b)	State and explain the Hume Rothery rules of solid solution formation with suitable example.	04
	(c)	Explain the nucleation and growth mechanism for the solidification of metals. OR	07
	(c)	Calculate the atomic packing factor for BCC and FCC structure	07
Q.3	(a)	Give detail classification of steels.	03
	(b)	Draw and briefly explain the Aluminum-Silicon binary phase diagram.	04
	(c)	Explain Austenite grain size? Explain any one technique.	07
Q.3	(a)	OR Evaluin allotropy of iron with next sketch	02
	(a) (b)	Explain allotropy of iron with neat sketch. Draw the Copper-Nickel binary phase diagram and explain it.	03 04
	(c)	Write a note on solidification of metals and alloys.	07
Q.4	(a)	Explain allotropy of iron with neat sketch.	03
	(b)	List out Coding of steel? Explain any one standard with suitable example.	04
	(c)	What is cooling curve? Draw the cooling curves for binary solid solution alloy and binary eutectic alloy.	07
0.4	(-)	OR	0.2
Q.4	(a)	Explain why C-Si ratio importance in cast Iron? Mention the effect of alloying elements on the properties of steel.	03
	(b) (c)	Discuss about Gray Cast iron with chemical composition, properties, application	04 07
	(C)	and microstructure.	U7
Q.5	(a)	Write in detail about basic steps required to prepare metallographic specimen.	03
	(b)	Explain Metallurgical Microscope with neat diagram.	04
	(c)	Write short note on Nodular Cast irons.	07
		OR	
Q.5	(a)	Discuss effect of impurities on properties of steel.	03
	(b)	Explain electrolytic polishing.	04

07

(c) Differentiate between Macroscopic and Microscopic Examination.