Seat No.:	Enrolment No.

## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VI (OLD) - EXAMINATION - SUMMER 2017** 

<b>Subject Code: 162101 Date: 05/0</b>		5/2017	
Ti	me: 1 structi 1 2	t Name: Physical Metallurgy - I  10:30 AM to 01:00 PM  Total Marks: ons:  Attempt all questions.  Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	70
Q.1	(a)	Define Miller Indices. Explain the procedure for finding Miller Indices. Draw (222) and [121].	07
	<b>(b)</b>	Explain Hume Ruthery rules for formation of solid solutions.	07
Q.2	(a)	Define crystal & Crystal system. List Different Crystal systems. Explain FCC and HCP with neat sketch.	07
	<b>(b)</b>	Define Solid solution. Discuss briefly Substitutional solid solution and Interstitial solid solution with neat sketch.  OR	07
	<b>(b)</b>	Explain tie line & lever rule for Fe – Fe <sub>3</sub> C diagram. Apply lever rule at 1050 <sup>o</sup> C temp. for 2.4% carbon containing Alloy.	07
Q.3	(a)	Give classification of phase diagram and Explain the tertiary phase diagram with suitable example.	07
	<b>(b)</b>	State Gibb's phase rule, define its each term and calculate the degree of freedom at melting point of pure metal and eutectic point  OR	07
Q.3	(a)	Define: Phase, Component, System, & Degree of Freedom with respect to phase diagram. Draw binary phase diagram for (i) CU- Ni (ii) Cu - Sn with all required notations.	07
	<b>(b)</b>	Explain the Following Reaction:  (i) Eutectic (ii) Peritectic (iii) Monotectic (iV) Eutectoid	07
Q.4	(a)	Draw iron –iron carbide diagram with all temp., phases, reactions and required notations.	07
	<b>(b)</b>	Define polymorphism. Explain the allotropy of Iron with necessary diagram. <b>OR</b>	07
Q.4	(a)	Classify the steels and Explain the effect of impurity elements on the properties of steel.	07
	<b>(b)</b>	Elaborate about the grain size designation. Explain the measurement of grain size, and its significance.	07
Q.5	(a) (b)	Briefly Explain the procedure of metallography with required neat sketch. Write a short note on gray cast iron.	07 07
Q.5	(a)	OR  Differentiate Macroscopic & Microscopic Examination. Define Nonmetallic	07
<b>V</b> .2	(a) (b)	Inclusion. Compare White Cast Iron & Gray Cast Iron.	07
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