Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VII (New) EXAMINATION – WINTER 2019

Subject Code: 2172112 **Date: 26/11/2019**

Subject Name: Physical Metallurgy of Special Purpose Non-ferrous Metals and Alloys

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain important characteristics of non-ferrous metals and alloys.	**03**
	(b)	Discuss about alloy designation system of Aluminum alloys.	**04**
	(c)	Classify the Tin-bronze and describe properties and applications of one example of each.	**07**
Q.2	**(a)**	Describe the important characteristics of Copper and its alloys.	**03**
	(b)	Justify---- Zn is added in Mg-Al alloys to improve strength	**04**
	(c)	Using Al-Mn phase diagram explain general description of Al-Mg alloys system.	**07**
		OR	
	(c)	Describe the typical composition, properties and applications of Ni-Cr-Al alloys.	**07**
Q.3	**(a)**	Limitations of non-ferrous metals & alloys.	**03**
	(b)	Using the Al-Cu alloy system as an example, explain the concept of precipitation heat treatment.	**04**
	(c)	Draw and describe the Mg-Zn phase diagram.	**07**
		OR	
Q.3	**(a)**	Write effect of Nickel on thermal expansion of Iron.	**03**
	(b)	Selection of Ti-alloys for service.	**04**
	(c)	Explain the solution heat treatment and aging process for Titanium alloys.	**07**
Q.4	**(a)**	Give a detailed classification of Magnesium alloys.	**03**
	(b)	Describe the methods to increase high temperature strength of Mg alloys.	**04**
	(c)	Write a note on heat treatment of Lead alloys.	**07**
		OR	
Q.4	**(a)**	Give the compositions, properties and applications of any one heat treatable Titanium alloys	**03**
	(b)	Describe the properties and applications of Zinc and its alloys.	**04**
	(c)	Using Pb-Sb Phase diagram describe the characteristics of Lead- Babbits. Give its typical composition and applications.	**07**
Q.5	**(a)**	Give limitations of Zinc alloys.	**03**
	(b)	Write a note on tin pest.	**04**
	(c)	Write a note on electrical applications of different precious metals.	**07**
		OR	
Q.5	**(a)**	What are rare metals? Classify rare metals with example of each.	**03**
	(b)	Give the composition, properties and applications of following Babbits: Cadmium-based Babbitt's.	**04**
	(c)	Write a note on heat treatment of Nickel alloys.	**07**