

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2018****Subject Code: 2172112****Date: 19/11/2018****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) Describe how the mechanical properties of Al and its alloys can be increased. **03**
(b) Draw and discuss Al-Si Phase diagram. **04**
(c) List typical properties of nonferrous alloys and explain any three in detail. **07**

- Q.2** (a) Describe the important characteristics of Copper and its alloys. **03**
(b) Why copper is a suitable material for automobile radiators? Explain **04**
(c) Using Al-Cu phase diagram explain general description of Al-Cu alloy system. **07**

OR

- (c) Describe different phases with properties present in Cu-Zn phase diagram. **07**
Q.3 (a) What are ALPHA brass and ALPHA/BETA brass? **03**
(b) Write effect of Nickel on thermal expansion of Iron & explain Invar **04**
(c) Explain Ni base super alloys. Explain importance of gamma prime in Ni base super alloys. **07**

OR

- Q.3** (a) Explain effect of Following alloying element on properties of Ni and its alloys: Cu, Al. **03**
(b) Discuss the heat treatment for sand cast AZ92A alloy. **04**
(c) Write a note on High temperature Mg-Alloys. **07**
Q.4 (a) Give limitations of Zinc alloys. **03**
(b) For Mg alloys deformation is only restricted to {1000} plane and $\langle 112 \cdot 0 \rangle$ direction---comment **04**
(c) What is beta Transus temperature & give effect of alloying elements on it. **07**

OR

- Q.4** (a) Give the Characteristics and applications of following rare metals and their alloys: Zirconium **03**
(b) Give the composition, properties and applications of following lead alloys:terne metal **04**
(c) Justify--- Noble metals can be successfully in dentistry. **07**
Q.5 (a) What are cupronickels? What is the use of monel metal? **03**
(b) Write a note on tin pest. **04**
(c) Describe the properties and applications of Lead and lead alloys. **07**

OR

- Q.5** (a) What are rare metals? Classify rare metals with example of each. **03**
(b) Describe the electrical applications and property requirement of Iridium and Osmium. **04**
(c) Discuss typical characteristics of babbitts and explain purpose of Cu addition in Tin-Babbitts. **07**
