

GUJARAT TECHNOLOGICAL UNIVERSITY**BE SEM-VI Regular Examination May 2011****Subject code: 162104****Subject Name: Advanced Materials and Applications****Date: 21/05/2011****Time: 10.30 am – 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) What do you mean by alloy cast Iron? Give the composition, properties and applications of High silicon cast iron. **07**
- (b) Discuss the characteristics of Titanium and Magnesium that makes them attractive for certain engineering applications. Also give their limitations. **07**

- Q.2** (a) What is inconel? Mention its composition, properties and applications. **07**
- (b) Describe the properties and applications of Austenitic stainless steel. Give the composition of 304 and 347 stainless steel. **07**

OR

- (b) What is sensitization? Discuss how Inter Granular corrosion is harmful for stainless steel. Mention the methods to minimize it. **07**

- Q.3** (a) What do you mean by Free cutting steels? Explain the role of sulphur group elements in it. Mention the properties and applications. **07**
- (b) Define amorphous alloys. Compare it with crystalline alloys. Discuss the copper mold casting technique to produce the metallic glasses. **07**

OR

- Q.3** (a) What do you mean by tool steel? Give its requirements, properties and applications. **07**
- (b) Mention properties of amorphous alloys. Discuss the piston and anvil technique to produce the metallic glasses. **07**

- Q.4** (a) Discuss the sol-gel technique for nano-material production. **07**
- (b) Define Piezoelectricity. Discuss the working of Piezoelectric materials in detail. **07**

OR

- Q.4** (a) Define nano materials and give applications. Write a note on carbon nanotubes. **07**
- (b) What do you mean by smart materials? Write a note on shape memory alloys. **07**

- Q.5** (a) Give the classification of bio-materials. Describe properties and application of Ni-Ti alloy as a useful bio-material. **07**
- (b) Discuss the properties and applications of cryogenic materials. **07**

OR

- Q.5** (a) Define biocompatibility. Discuss properties and application of Co-Cr-Mo alloys as a bio-material. **07**
- (b) Define superconductivity. Describe properties and applications of superconductors. **07**
