

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VI • EXAMINATION – SUMMER • 2014

Subject Code: 162104**Date: 28-05-2014****Subject Name: Advanced Materials and Applications****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) Discuss important characteristics of Aluminum that makes it attractive for engineering applications. **07**

(b) Give the classification, properties and applications of Fe-based super-alloys. **07**

Q.2 (a) What do you mean by alloy cast Iron? Write the composition, properties and applications of Ni-hard cast iron. **07**

(b) Define bio-materials. Explain bio-inertness and bio-functionality. Write applications of Biomaterials. **07**

OR

(b) Describe properties and application of Ni-Ti alloy as important bio-material. **07**

Q.3 (a) What is Electro-rheological fluid? Describe the Properties and applications of Electro-rheological fluid. **07**

(b) Discuss important characteristics and applications of High speed steel. Give composition of one Tungston base & one Molybdenum base High speed steel. **07**

OR

Q.3 (a) Define Smart Materials. Write a note on shape memory alloys. **07**

(b) What do you mean by tool steel? Discuss its requirements, properties and applications. **07**

Q.4 (a) Describe the properties and applications of Austenitic stainless steel. Give the composition of 304L and 347 Stainless steel. **07**

(b) Explain role of Glass Transition temperature in glass formation. Compare metallic glasses with crystalline alloys. **07**

OR

Q.4 (a) What is Hadfield steel? Describe the Properties and applications of Hadfield steel. Give composition. **07**

(b) What are metallic glasses? Describe the properties and applications of metallic glasses. **07**

Q.5 (a) Describe Sol-gel technique for nano-material production. Write its advantages. **07**

(b) Define composites. Discuss properties & applications of ceramic matrix composites. **07**

OR

Q.5 (a) Define Nanotechnology. Write a note on carbon nanotubes. **07**

(b) Define superconductivity. What are type I and type II super conductors. Describe properties and applications of superconductors. **07**
