

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-V • EXAMINATION – SUMMER • 2014**

**Subject Code: 150106****Date: 24-06-2014****Subject Name: Composite material and smart structures****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) Briefly explain about composite materials and compare the characteristics of composite materials with metallic materials. **07**
- (b) Give the detail classification of composite on the basis of matrix material and reinforcing element. **07**
- Q.2** (a) Enlist the properties of Poly-Ether-Ether-Ketone (PEEK) as a matrix material. **07**
- (b) Explain about the micro electro mechanical systems (MEMs) and list its application. **07**
- OR**
- (b) Explain about Acoustic Emission (AE) Techniques. **07**
- Q.3** (a) Explain about magnetostrictive materials and discuss its applications. **07**
- (b) Describe the metal matrix composite material. **07**
- OR**
- Q.3** (a) List the different materials used as a fiber in a composite material and explain properties of boron fiber. **07**
- (b) Explain about A-scan, B-scan and C-scan. **07**
- Q.4** (a) Explain the stress stain law for a single ply in laminate axes for off-Axis Laminates. **07**
- (b) Describe with neat sketch, the different wave pattern of fibers used in composite. **07**
- OR**
- Q.4** (a) Explain about self-healing composite material. **07**
- (b) List the criteria used during ply orientation in laminate composite and explain about symmetric lay up with coding. **07**
- Q.5** (a) Describe the statistical analysis of tensile strength for fiber composite material. **07**
- (b) Explain the Tsai-Wu tensor failure criteria in detail. **07**
- OR**
- Q.5** (a) Explain the stress concentration and edge effect. **07**
- (b) Explain buckling of laminates and buckling of fibers. **07**

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