## GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER V • EXAMINATION - WINTER - 2012

Subject code: 150106 Date: 23-01-2013 **Subject Name: Composite Materials and Smart Structures** Time: 02:30 pm to 05:00 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 about composite material and give its detail classification. **07 (b)** Compare the characteristics of composite materials with metallic materials. **07 Q.2** (a) Describe about the micro electro mechanical systems (MEMs). 07 **(b)** Explain buckling of laminates and buckling of fibers. 07 OR **(b)** What is the meaning of shape memory alloy? Enlist its advantages. 07 **Q.3** (a) Classify the aramid fibers and list its properties and application. 07 **(b)** Explain the function of matrix material in a composite. 07 OR Q.3(a) Differentiate the thermosets and thermoplastics. 07 **(b)** Describe about the metal matrix composite material. 07 0.4 (a) Explain about symmetric lay-up code with suitable example. **07** Explain the stress stain law for a single ply in the material axes for **07** unidirectional laminates. OR (a) Explain major poisson's ratio and in-plane shear modulus of fiber composite 0.4 07 material. (b) Describe the stress concentration around holes in orthotropic laminate 07 composite material. **Q.5 07** (a) Write the short note on edge effects of composite material. (b) Describe the statistical analysis of tensile strength for fiber composite 07 material. OR **Q.5** (a) What is the meaning of smart material? Explain different types of smart **07** material. **(b)** Describe the fracture mechanics of fiber composite material. 07

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