*Seat No.: _____* *Enrolment No._____*

# GUJARAT TECHNOLOGICAL UNIVERSITY

## BE SEM-VIII Examination May 2012

## Subject code: 182103

## Subject Name: Composite Materials (Departmental Elective-II)

**Date: 08/05/2012** **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.**

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|---|---|---|---|
| **Q.1** | **(a)** | Define composite. Discuss detailed classification of composite materials. | **07** |
| | **(b)** | What do you mean by matrix and reinforcement? Give role of each in a composite material. | **04** |
| | **(c)** | Explain the importance of composites over other conventional materials. | **03** |
| **Q.2** | **(a)** | Draw a lay out for synthesis of Nano-composites. Describe unique properties exhibited by Nano- composites. | **07** |
| | **(b)** | What are the Dispersion strengthening composites? Give examples and describe their properties and applications. | **07** |
| | | **OR** | |
| | **(b)** | What are the Fiber reinforced composites? Discuss the factors affecting mechanical Properties of Fiber reinforced composites. | **07** |
| **Q.3** | **(a)** | Explain the characteristics of fibers & resin materials in Polymer matrix composites. Give applications of Polymer matrix composites. | **07** |
| | **(b)** | A composite made from 60% volume of Glass fiber & epoxy resin. Given: For Epoxy $E=21\times10^2$ MPa, T.S. =60MPa, For glass fiber $E=72\times10^3$MPa, T.S.=2502MPa. Calculate: I. E & T.S. of composite material. II. Load shared by Two Phases, Load is in direction of alignment of fiber. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Critically compare the discontinuous and continuous fiber composites. | **07** |
| | **(b)** | Discuss in detail the strengthening mechanism in composites. | **07** |
| **Q.4** | **(a)** | Describe with neat sketch the following reinforcements: I. Particulates II. Flakes III. Whiskers | **07** |
| | **(b)** | What is interface? Explain the role of interfaces in composites. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | What is a “Hybrid” composite? Compare it with normal fiber composites. | **07** |
| | **(b)** | Describe the Toughening mechanisms in ceramic matrix composites. | **07** |
| **Q.5** | **(a)** | List different fabrication methods of Polymer matrix composites and explain any one. | **07** |
| | **(b)** | Compare the metal matrix composites with ceramic matrix composites. Give examples of each class. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain why glass fibers are commonly used for reinforcement. Give the need of glass fibers surface perfection. What measures are taken to protect the surface of glass fibers? | **07** |
| | **(b)** | Explain the fabrication methods of fiber reinforced plastics. | **07** |

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