Enrolment No.\_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

| Subject code: 2712806 Date: 09-01-2<br>Subject Name: Advanced Material Technology |                |   |          |
|---|----------------|---|----------|
| Tii   | ne: 02         | 2:30 pm - 05:00 pm Total Marks: 70  |          |
| Ins   | 1.<br>2.<br>3. | ions:<br>Attempt all questions.<br>Make suitable assumptions wherever necessary.<br>Figures to the right indicate full marks.   |          |
| Q.1   | (a)<br>(b)     | Explain the fracture behavior of engineering materials<br>What are the types of fracture in metals? Discuss in detail the ductile fracture.                             | 07<br>07 |
| Q.2   | <b>(a)</b>     | Explain mechanism of solid solution hardening. Explain factors affecting solid solution hardening.  | 07       |
|   | <b>(b)</b>     | What is work hardening? Explain various stages of work hardening.   | 07       |
|   | (b)            | Explain Griffithøs criterion for material failure. Explain stress intensity factor.   | 07       |
| Q.3   | <b>(a)</b>     | Enlist some smart materials with its characteristics. Explain applications of smart materials in engineering.   | 07       |
|   | (b)            | Explain in detail the effect of temperature on properties of materials.<br>OR   | 07       |
| Q.3   | <b>(a)</b>     | Explain the factors to be considered for selecting material for aviation, automobile and nuclear application.   | 07       |
|   | <b>(b)</b>     | Explain fatigue limit with diagram for various metals. Explain fatigue test.  | 07       |
| Q.4   | <b>(a)</b>     | Justify development of advanced materials. How ceramic materials are processed?   | 07       |
|   | (b)            | Explain constituents, advantages and applications of high strength low alloy steel.   | 07       |
|   |                | OR  |          |
| Q.4   | (a)<br>(b)     | Explain characteristics and applications of engineering polymers.<br>Discuss trends in development of bio materials and its characterization.                           | 07<br>07 |
| Q.5   | (a)<br>(b)     | How composite materials is better than convention material. Justify it.<br>Classify composite materials. Explain any one production technique of<br>composite material. | 07<br>07 |
| 0.5   | <b>(</b> 8)    | <b>UK</b><br>Define the term composite materials. Explain properties and application of   | 07       |
| <b>~</b> ~  | (4)            | composite materials.  |          |
|   | (b)            | How tensile test of composites is performed?  | 07       |

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