

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013****Subject code: 1725008****Date: 02-01-2014****Subject Name: Rapid Prototyping****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) Explain the new product development process with suitable example. **07**
(b) Discuss design for X. **07**

- Q.2** (a) Explain the reverse engineering strategy in rapid prototyping. **07**
(b) Explain types of geometric models and why CAD model is required to convert into STL file format in RP process. **07**

OR

- (b) Describe the different phases of finite element method and explain the processing phase with an example. **07**

- Q.3** (a) Enlist the features of an advanced CNC machine. **07**
(b) Enlist the different parts of Robot and explain Cartesian type of configuration. **07**

OR

- Q.3** (a) Describe the Variant type CAPP system. **07**
(b) Explain the Indirect rapid tooling process. **07**

- Q.4** (a) Write the benefits of product data management system. **07**
(b) What are the barriers to CIM? How to overcome them? **07**

OR

- Q.4** (a) Explain the procedure of constructing the 3D model. **07**
(b) Explain in detail the methodology of concurrent engineering. **07**

- Q.5** (a) Explain with sketch the laminated object manufacturing process. **07**
(b) A prototype of a tube with a square cross section is to be fabricated using stereolithography. The outside dimension of the square = 150 mm and the inside dimension = 120 mm. The height of the tube (z-direction) = 100 mm. Layer thickness = 0.20 mm. The diameter of the laser beam ("spot size") = 0.40 mm, and the beam is moved across the surface of the photopolymer at a velocity of 600 mm/s. Compute an estimate for the time required to build the part, if 0.5s are lost each layer to lower the height of the platform that holds the part. **07**

OR

- Q.5** (a) Explain Stereolithography and enlist its limitation. **07**
(b) A prototype of a tube with a square cross section is to be fabricated using fused deposition method. The outside dimension of the square = 150 mm and the inside dimension = 120 mm. The height of the tube (z-direction) = 100 mm. Layer thickness is to be 0.25 mm and the width of the extrudate deposited on the surface of the part = 1.5 mm. The extruder work-head moves in the x-y plane at a speed of 200 mm/s. A delay of 10 sec is experienced between each layer to reposition the work-head. Compute the time required to build the part. **07**
