Seat No.: _____ Enrolment No._____

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 =120mm. 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 05s are lost each layer to lower the height of the platform that holds the part.	**07**
		OR	
Q.5	**(a)**	Explain Steriolithography 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**

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