Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER IV (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2742803 **Date:04/05/2016**

Subject Name: RAPID PROTOTYPING, TOOLING AND SYNERGIC INTEGRATION

Time:10:30 am to 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)**	Describe the Innovation process and its impact on economy.	**07**
	(b)	Explain the influence of the rapid prototyping processes on the product development process.	**07**
Q.2	**(a)**	How data points are acquired in reverse engineering? Explain various methods.	**07**
	(b)	Enlighten the concept of discretization and briefly explain importance of mesh size in FEA with example.	**07**
		OR	
	(b)	List the various types of solid models and write the advantages and disadvantages of constructive solid geometry models.	**07**
Q.3	**(a)**	Explain with neat sketches the differences between additive fabrication and subtractive fabrication. Enlist the advantages of additive fabrication over subtractive fabrication.	**07**
	(b)	Describe the Generative type CAPP systems with example.	**07**
		OR	
Q.3	**(a)**	What is canned cycle? Explain with neat sketches the differences between the operation of the canned cycles G81 and G83.	**07**
	(b)	Classify in detail the rapid tooling processes.	**07**
Q.4	**(a)**	Describe the components of CIM.	**07**
	(b)	Write the difference between virtual reality and augmented reality? List the devices used for both.	**07**
		OR	
Q.4	**(a)**	Explain in detail the methodology of concurrent engineering.	**07**
	(b)	Explain product data management and Enlist the benefits of product data management system.	**07**
Q.5	**(a)**	Explain the Ballistic particle manufacturing with neat sketch.	**07**
	(b)	A prototype of a tube with a square cross section is to be fabricated using stereolithography. The outside dimension of the square = 100 mm and the inside dimension = 90 mm (wall thickness = 5 mm except at corners). The height of the tube (*z*-direction) = 80 mm. Layer thickness = 0.10 mm. The diameter of the laser beam (“spot size”) = 0.25 mm, and the beam is moved across the surface of the photopolymer at a velocity of 500 mm/s. Compute an estimate for the time required to build the part, if 10 s are lost each layer to lower the height of the platform that holds the part. Neglect the time for post-curing.	**07**
		OR	
Q.5	**(a)**	Explain with sketch the Solid ground curing process.	**07**

(b) A prototype of a tube with a square cross section is to be fabricated using fused deposition modeling. The outside dimension of the square = 100 mm and the inside dimension = 90 mm (wall thickness = 5 mm except at corners). The height of the tube (*z*-direction) = 80 mm. Layer thickness is to be 0.20 mm and the width of the extrudate deposited on the surface of the part = 1.25 mm. The extruder workhead moves in the *x*-*y* plane at a speed of 150 mm/s. A delay of 10 s is experienced between each layer to reposition the workhead. Compute an estimate for the time required to build the part. **07**

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