Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013

Subject code: 1722803 Date: 03-06-2013

Subject Name: Product Design for Manufacturing

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.**
4. **Symbols and notations carry usual meaning.**

Q.1	**(a)**	Discuss the process of material selection for flywheel.	**07**
	(b)	Explain general design considerations for manual assembly.	**07**
Q.2	**(a)**	What is meant by assembly efficiency? Explain with an illustration.	**07**
	(b)	Enlist various cost elements for manufacturing a machined component.	**07**
		OR	
	(b)	A steam engine flange is to have 6 holes of 22mm diameter, equispaced a pitch circle diameter of 400 mm. The thickness of the flange is 28 mm. The allowable cutting speed and feed rates are 0.3m/s and 0.18mm/rev respectively. The point angle may be assumed to be 120^o and the speeds available are 112,160,225,320,450and 640 rpm. The fixing time per piece is 1 minute. Find the cost of drilling 1000 pieces, if hourly labour and overhead costs are Rs.20 and the drilling is done on 1. A radial drilling machine 2. A multispindle drilling machine	**07**
Q.3	**(a)**	Discuss the various steps to be followed for applying DFM.	**07**
	(b)	Explain various steps in the design process.	**07**
		OR	
Q.3	**(a)**	Explain Pugh concept selection method.	**07**
	(b)	Select a tool material for thread-rolling mild-steel bolts. In your analysis of the problem you should consider the following points: (1) functional requirements of a good tool material, (2) critical properties of a good tool material, (3) screening process for candidate materials, and (4) selection process	**07**
Q.4	**(a)**	Discuss the design guidelines for sheet metal work.	**07**
	(b)	You are the designer of a crankshaft for an automotive engine and decided to make this part from nodular cast iron using a casting process. During design you consult frequently with an experienced manufacturing engineer from the foundry where the part will be made. What design factors determine the manufacturing cost? Which of the costs are chiefly determined by the foundry and which by the designer?	**07**
		OR	
Q.4	**(a)**	Explain the expert system for ergonomic considerations.	**07**
	(b)	Discuss the application of anthropomorphic data in ergonomic design.	**07**
Q.5	**(a)**	Explain the design guidelines for sand casting.	**07**
	(b)	Discuss design criteria for joining process with a case study.	**07**
		OR	
Q.5	**(a)**	What is parametric analysis? What is the role of it in design of manufacturability?	**07**
	(b)	Explain the significance of aesthetics in product design.	**07**