Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) EXAMINATION – WINTER 2017

Subject Code: 2181921 Date: 18/11/2017

Subject Name: Design for Manufacturing and Assembly

Time:02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Enumerate the steps to be followed when DFMA is used in the design process.	**03**
	(b)	Why DFMA should be implemented? Explain.	**04**
	(c)	Select most suitable material and major manufacturing process/processes for each of the following applications. Justify your answer on the basis of functional requirement of the product and "ease of manufacturing". (1) Roof structure made of angles, channels (2) Lathe bed (3) Line pipe used in households.	**07**
Q.2	**(a)**	Explain with neat sketches, what are the general dimensioning rules to prepare a manufacturing drawing.	**03**
	(b)	"It is preferred to design a part so that as many manufacturing operations as possible can be performed without repositioning it." Justify with appropriate example.	**04**
	(c)	"To produce too tight tolerances, extra cost (sometimes 3 to 4 times) has to be paid." Evaluate with appropriate reasons, justify your answer with suitable examples.	**07**
		OR	
	(c)	"Avoid non value addition processes." Justify with an appropriate example where such non-value process has to be added and could be avoided.	**07**
Q.3	**(a)**	A smaller diameter hole (less than ϕ 10 mm) is preferred to be produced by drilling after casting rather than to be produced with casting. Evaluate with appropriate reasons.	**03**
	(b)	What is 'hot spot' in the casting? Where does it form? Why? What are the remedies to eliminate/shift hot spots in the casting?	**04**
	(c)	Illustrate casting design rules to produce a sound casting with lowest cost.	**07**
		OR	
Q.3	**(a)**	Prima facie, when metal casting should be chosen? Why?	**03**
	(b)	Why there is a minimum section thickness criterion for different alloys to be casted?	**04**
	(c)	Illustrate redesigning of castings in the context of parting line considerations and to obviate the cores. Explain the rationale for redesigning.	**07**

Q.4	**(a)**	Prima facie, when metal forming should be chosen? Why?	**03**
	(b)	What is process capability in the context of machining processes? What is Cp and Cpk? What inferences can be drawn from these indicators?	**04**
	(c)	What is the effect of the material factors like strength, hardness, ductility, coefficient of friction and strain hardenability on the machinabilty, surface finish and tool life? Justify your comments with appropriate reasons.	**07**

OR

Q.4	**(a)**	List the recommendations to be considered for the design of assembly.	**03**
	(b)	Explain how group technology is helpful in DFMA.	**04**
	(c)	Illustrate the design features for machining especially for drilling and milling operations.	**07**
Q.5	**(a)**	Illustrate an example of product where principle of recyclability has been employed.	**03**
	(b)	Discuss the local and regional issues influencing design for environment.	**04**
	(c)	Illustrate the design for manufacturability recommendations for closed die forged parts.	**07**

OR

Q.5	**(a)**	Name the lifecycle assessment methods used in design for environment.	**03**
	(b)	Discuss the global issues influencing design for environment.	**04**
	(c)	Why is it necessary to consider impact of the environment in the product design? With the help of schematic diagram, explain product's entire life cycle and related environmental issues influencing product design.	**07**

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