Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – IV • EXAMINATION – SUMMER • 2014

Subject code: 745001 **Date: 04-06-2014**

Subject Name: Quality Engineering in Manufacturing

Time: 02:30 pm - 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.**

Q.1 **(a)** What is quality and what factors are to be considered in the design of products? **07**

(b) Develop the equation for taguchi loss function. **07**

Q.2 **(a)** What is factorial design? Explain the concept of main effect and interaction effect with suitable example. **07**

(b) A manufacturer of television sets is interested in the effect on tube conductivity of four different types of coating for color picture tubes. The following conductivity data are obtained. Is there a difference in conductivity due to coating type? Use Ŭ= 0.05. **07**

Coating Type	Conductivity			
1	143	141	150	146
2	152	149	137	143
3	134	136	132	127
4	129	127	132	129

OR

2 **(b)** The two-way table gives data for a 2x2 factorial experiment with two observations per factor ï level combination. Construct the ANOVA table for this experiment and do a complete analysis at a level of significance 0.05. **07**

		Factor B	
	Level	1	2
Factor A	1	29.6 35.2	47.3 42.1
	2	12.9 17.6	28.4 22.7

Q.3 **(a)** What are the test strategies used in orthogonal arrays? **07**

(b) What do you mean by resolution power of an experiment? What resolution is provided with 2 three-level factors in an L9 OA? How? **07**

OR

Q.3 **(a)** How number of experiments to be carried out will be eliminated by OA? Explain with suitable example. **07**

(b) Derive the equations for SS_{total}, $SS_{between}$ and SS_{within} for one way ANOVA test. **07**

Q.4 **(a)** What do you mean by Noise factors? Clearly differentiate between Outer noise, Inner noise and Product noise. **07**

(b) Calculate the S/N_{LB} this data for one inner array trial: 23, 25, 21, 20, 23, 19. **07**

OR

Q.4 **(a)** Write short note on ñParameter Design Strategyò. **07**

(b) Calculate the S/N_{HB} this data for one inner array trial: 110, 115, 112, 105. **07**

Q.5 **(a)** Write short note on ñBusiness process re-engineeringò. **07**

	(b)	Describe steps for construction of ñFishbone diagramò with suitable example.	**07**
		OR	
Q.5	**(a)**	Write short note on ñSix sigmaò.	**07**
	(b)	What is the need and application of ISO-9000?	**07**

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