

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 $\bar{U} = 0.05$. **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 i level combination. Construct the ANOVA table for this experiment and do a complete analysis at a level of significance 0.05. **07**

Factor A	Factor B		
	Level	1	2
	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 $\hat{n}$ Parameter Design Strategy. **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 $\hat{n}$ Business process re-engineering. **07**

(b) Describe steps for construction of Fishbone diagram with suitable example. 07

OR

Q.5 (a) Write short note on Six sigma. 07

(b) What is the need and application of ISO-9000? 07
