Code No: C5207 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations, March/April-2011
QUALITY ENGINEERING IN MANUFACTURING
(DESIGN FOR MANUFACTURING)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks
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1.a) Explain Taguchi loss function with derivative for the model "Nominal the best" and explain how one attribute of the loss functions helps to determine the factory tolerances.

b) Quality is viewed differently by different people. How would you view if you were:
a) An engineer in charge of quality department
b) Customer. [12]

2. An automobile manufacturer requires that the spindle in the steering mechanism be supplied to the diameter specification of $M \pm 20\mu m$. The loss caused by a defective spindle is Rs. 2400. The manufacturer observed the deviations given below, from two suppliers. If the price of the spindle is same for both the suppliers which supplier be preferred:
a) If mean cannot be adjusted to the target
b) If the mean can be adjusted to the target. [12]

supplier	Deviation from the target											
1	-5	8	5	-4	3	-2	5	4	0	1	0	3
2	-6	-3	-5	-6	7	-5	-3	-7	-7	-6	-4	-8
	8	-4	-6	2	5	3	0					
	-6	-3	-8	-6	-5	-4	-9					

3. Distinguish between system design, parameter design and tolerance design and explain their role in reducing the effects of noise factors during product and process design stages. [12]

4. An engineer respects that the surface finish of a metal part is influenced by feed rate & depth of cut. He selects three feed rates & four depths of cut. He then conducts three replicates of each experiment and obtains the following data on surface roughness.

	Depth of Cut			
Feed rate	0.15	0.18	0.20	0.25
0.20	74, 64, 60	76, 68, 73	82, 88, 92	99, 104, 102
0.30	92, 86, 88	98, 88, 104	99, 108, 100	104, 110, 98
0.35	99, 99, 102	104, 100, 99	101, 102, 100	114, 111, 117

Prefer ANOVA and draw conclusions $\alpha = 0.05$ [12]

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5. Explain with examples the importance of OA in design of experiments and indicate the stages involved in selective appropriate OA's. [12]

6. Explain the process of DOE indicating the steps involved in the planning phase, conducting phase and analysis phase. [12]

7.a) Briefly explain six sigma philosophy and benefits of its use in organizations.
b) What is Bench marking and gives benefits of Bench marking if followed? [12]

8. Explain pre requisites and steps for implementing BPRE. [12]

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