MEC612 2008 QUALITY ENGINEERING AND MANAGEMENT Test I

Time: 50 minutes Max marks: 10X2=20

1. Explain Philip Crosby's background and contribution to Quality Management.
2. Define the terms Management and Quality Management according to ISO9000:2000.
3. Discuss the different meanings associated with the word "Total" in TQM.
4. What are the deadly diseases afflicting management, as identified by Deming?
5. A glass pane has to fit a window frame slot. If it does not, the repair cost is Rs500/-. The slot has a specified width of 5+/-0.5mm. Determine the quality loss when the thickness of the pane is 5.2mm.
6. An experiment is to be conducted to study the factors affecting tool life in machining. The factors considered are: Workpiece hardness (three levels), Cutting speed (three levels), Rake angle (two levels) and Nose radius (three levels). No interactions are expected. Determine a suitable OA from the following table explaining the reasons:

OA	Number of rows	Maximum Number of Factors	Maximum number of columns			
			2-level	3-level	4-level	5-level
OA4	4	3	3	-	-	-
OA8	8	7	7	-	-	-
OA9	9	4	-	4	-	-
OA12	12	11	11	-	-	-
OA16	16	15	15	-	-	-
OA16	16	5	-	-	5	-
OA18	18	8	1	7	-	-
OA25	25	6	-	-	-	6
OA27	27	13	-	13	-	-
OA32	32	31	31	-	-	-
OA32	32	10	1	-	9	-
OA36	36	23	11	12	-	-
OA36	36	16	3	13	-	-

7. The tensile strength of a newly developed material was tested on 5 samples, with the results: 25, 20, 22, 23, 19. The existing material had given results: 23, 20, 26, 24, 17. Determine the better material using Taguchi's signal to noise ratio.
8. Determine the interaction AB for the OA8 experiment with four factors and two replications, with results (R1 &R2):

TC	A 1	B 2	3	C 4	D 5	6	7	R1	R2
1	1	1	1	1	1	1	1	13	11
2	1	1	1	2	2	2	2	14	16
3	1	2	2	1	1	2	2	23	25
4	1	2	2	2	2	1	1	24	26
5	2	1	2	1	2	1	2	14	12
6	2	1	2	2	1	2	1	15	13
7	2	2	1	1	2	2	1	21	19
8	2	2	1	2	1	1	2	18	10

9. Explain the deficiency of Taguchi's inner array outer array design. What is the alternative recommended by Montgomery?
10. Explain the composition and functions of the Quality Council.

SOLUTIONS TO NUMERICAL PROBLEMS:

5.

$k = A/\Delta^2 = 500/0.5^2 = 2000$
$L = 2000(y-\tau)^2 = 2000(5.2-5)^2 = Rs80$

6.
OA9

7.

S/NL New = 26.6448
S/NL Old = 26.54981
New is better

8.

AB = (24+25+13+14)/4 – (12+15+20+14)/4 = 3.75