Roll No .....

MMPD/MMIE-202

M.E./M.Tech., II Semester

Examination, June 2013

Reliaility Engineering and Quality Management

Time : Three Hours

Maximum Marks : 70

Note: Attempt any five questions. All questions carry equal marks.

1. a) Explain, why reliability life testing is required? Enlist its advantages.

   b) Two fuel pumps, each having a weibull failure distribution with $\beta = 1/2$ and $\theta = 1000\,hr$, are configured to provide a redundant system. Find the system reliability for a 100-*hr* mission and the system MTTF.

2. The failure data for ten electronic components is given in table. Compute and plot failure density, failure, rate, reliability and unreliability functions.

Failure No.	1	2	3	4	5	6	7	8	9	10
Operating tissue hr.	7	22	32	45	62	80	110	140	180	250

3. a) State the important objectives of "Quality Control"? Explain briefly how these objectives are achieved in Engineering Industry?

b) Explain the term "Quality Assurance function"? State the advantages of quality assurance?

4. Describe three methods of plotting a frequency diagram? What type of information may they indicate?

5. A certain product has been statistically controlled at a process average of 36.0 and a standard deviation of 1.00. The product is presently being sold to two users who have different specification requirements. User A has established a specification of 38.0 ± 4.0 for the product, and user B has specification of 36.0 ± 4.0.

   a) Based on the present process set up. What percent of the product produced will not meet the specifications set up by user A?

   b) What percent of the product will not meet the specifications of user B?

   c) Assuming that the two users needs are equal, a suggestion is made to shift the process target to 37.0. At this suggested value what percent of the product will not meet the specification of user A?

6. a) Explain the various types of sampling plans which are in practice in industry with their respective acceptance criteria.

   b) Differentiate between single sampling plan and Double sampling plan?

7. In a double sampling 2% AOQL acceptance/rectification plan:

   $n_1 = 32 \quad c_1 = 0$

$n_2 = 38 \quad c_2 = 0$

N = 1000.

Determine :

i) The probability of acceptance of a 2% defective lot.

ii) The average total inspection.

8. Write short notes on following (any four):

   i) Quality function deployment.

   ii) Quality circles.

   iii) Economics of acceptance sampling.

   iv) Inspection and quality control.

   v) Taguchi loss function.

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