No. of Printed Pages : 3

BME-007

00521

BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)
B.Tech. (AEROSPACE ENGINEERING)

Term-End Examination

December, 2013

BME-007 : QUALITY ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any five** questions. All questions carry equal marks.*

1. (a) Define quality and explain what quality control means for a manufacturer and a service provider ? 4

(b) Bring out the necessary features of : 6
(i) quality of design
(ii) quality of performance and
(iii) quality of performance

(c) What are the effects of quality ? 4

2. (a) What do you understand by total quality management and state basic principles that are followed in TQM ? 4

(b) What charts are used in TQM ? Describe three of them. 4

(c) In a heat treatment process the samples are drawn and averages calculated. The nine averages of nine samples are as follows : 6

Sample No :	1	2	3	4	5	6	7	8	9
Hardness (RC)	51	51.2	51.5	50	49.2	49.6	52	51	49.8

Find upper and lower control limits :

3. (a) List eight elements of TQM and seven tools for quality improvement. 7½

(b) Define best estimate, most likely estimate and worst estimate for completion of a task. 3

(c) The best, most likely and worst estimates for three tasks A, B and C are given as follows : 3½

Task A : 3/ 6/ 8 days
Task B : 3/ 5/ 9 days
Task C : 5/ 8/ 14 days

The tasks A, B and C are to be done in sequence. Find number of days to complete all three tasks

4. (a) Discuss the components of ISO 9000. 7

(b) What are the documents required for implementation of ISO 9000 ? 7

5. (a) Differentiate between population mean and sample mean. Define t-Statistic. How is t-statistic used to determine the significance ? 4

(b) In a process of heat treatment the hardness of steel bar is specified as 300 BHN with 95% confidence limit. Nine samples are drawn during the process and hardness measured for each sample. The values are : 10

Sample No :	1	2	3	4	5	6	7	8	9
Hardness, BHN :	302	304	298	296	297	303	306	299	300

The student's t value for d.o.f of measurement in 2.306.

Calculate (i) mean of sample means
(ii) standard deviation of sample means
(iii) t - statistic
(iv) 95% confidence limits

State if difference between sample mean and population mean is significant.

6. (a) What is QFD and what advantages can be derived from QFD ? 5

(b) What is process FMEA ? What quality objectives are served by FMEA ? 4

(c) What is dispersion analysis in producing cause and effect diagram ? 5

7. (a) What is meant by system reliability ? Describe three uses concerning reliability. 3

(b) Define maintainability, mean time to repair, and mean time between failures. How is the probability of "no failure before time T" is determined ? 5

(c) Three machines having reliabilities as : A = 0.9, B = 0.72, C = 0.68 are working in parallel. To increase production it is desired to add machines. D and E with reliabilities as : D = 0.9 and E = 0.8. D and E are to be placed either in series or parallel but the combination of D and E is to be in series with combination of A, B and C which is in parallel. It is also required that the resultant probability is not to exceed the highest probability of an individual machine. 6

8. (a) How is customer satisfaction related to quality of product or service ? What is customer value and how does it influence the working of an organization ? 6

(b) Starting from Taylorism describe the views of different quality experts for implementing total quality. Do the view differ or conflict in any aspect ? 8