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BME-007

B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) / B.Tech. AEROSPACE ENGINEERING (BTAE)

00820

Term-End Examination

June, 2014

BME-007 : QUALITY ENGINEERING

Time : 3 hours *Maximum Marks : 70*

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

1. (a) Different organisations have defined quality. State at least three definitions and discuss if all of them lead to the same conclusion. *4*

(b) Bring out the essential features of quality control and quality assurance. Are these two inclusive functions ? *5*

(c) Discuss importance of audit in quality assurance. What different audits are essentially carried out ? *5*

2. (a) How could you justify the popularity of the concept of Total Quality Management ? *3*

(b) What are three axioms of TQM ? *3*

(c) What are Deming's suggestions for achieving total quality ? *8*

3. (a) Distinguish between an activity and an event. Make an activity network diagram showing activity and event. *4*

(b) Best estimate (B), most likely estimate (M) and worst estimate (W) for each of four tasks A, B, C and D are described. The tasks have to be done in sequence of either ABD or ACD since requirement of beginning of D is completion of either B or C. Which sequence will be chosen to finish task D ?

Time Estimate (hours)				
B –	2	3	2	3
M –	4	4	4	4
W –	5	6	6	5
Task –	A	B	C	D

10

4. (a) Discuss the requirements of ISO 9000 – 9004. *7*

(b) Why are safety procedures becoming requirements of good management ? What steps are to be taken for safety and good health of workers under the guidelines of OSHA ? What benefits are expected from occupational safety policy ? *7*

5. (a) What are the measures of central tendency in a set of observations ? List them and give their applications. *4*

(b) A supplier has received a large order for supplying bars of strength 60 N/mm^2. During the process a sample of 9 rods is drawn from 90 lengths that are manufactured. The measured strengths on 9 sample rods are

Strength (N/mm^2) – 61, 61·2, 60·5, 60, 59·8, 59·5, 59·4, 59·2, 59·1.

The buyer has demanded a confidence level of 95% in specified strength.

Calculate two measures of central tendency. Find t-statistic of test result and compare with student's t corresponding to confidence level of 95%, which is $t_{0.05}$ = 2·306 for dof = 8. Find 95% confidence limits on population mean. *10*

6. (a) Out of total possible events "b", "a" successful (or favourable) events occur. Define probability of failure (unsuccessful event). State additive and multiplicative laws of probability. *5*

(b) How is probability distributed ? Show the distribution on a diagram and write equation for the curve. Explain all the terms. How is a normal distribution transformed into standard normal distribution ? *4*

(c) A machine is producing 1000 bolts in an hour and 5% bolts are expected to be defective. In a sampling plan, acceptance number is fixed at 2 and 50 bolts are randomly chosen from the lot of 1000 bolts. What is the probability of acceptance of the lot ? *5*

7. (a) What is Six Sigma methodology ? How does it help in assuring quality ? *4*

(b) What are Failure Mode and Effects analysis and Failure Modes Effects and Criticality analysis ? Give basic analysis procedure. What are the applications and benefits of these analyses ? *6*

(c) Describe attributes which would made the product defective. Would the defects arise in manufacturing or they may be in design ? *4*

8. (a) What do you understand by availability of a machine or equipment ? Define three types of availability. *5*

(b) How does quality affect cost of a product or process ? Distinguish between direct and indirect quality costs. How will the cost behave with improving quality awareness ? *6*

(c) Write notes on Deming Prize or Baldrige Award. *3*
