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**BACHELOR OF TECHNOLOGY IN
MECHANICAL ENGINEERING
(COMPUTER INTEGRATED
MANUFACTURING)**

Term-End Examination

June, 2010

BME-007 : QUALITY ENGINEERING

Time : 3 hours

Maximum Marks : 70

Note : Attempt any ten questions. All questions carry equal marks. Use of scientific non-programmable calculator is allowed.

1. (a) Define the term quality control and explain its objectives. 3½
- (b) How does quality affect a supplier's economy ? 3½
2. (a) What is zero defect concept ? How zero defect concept can be implemented ? 3½
- (b) Discuss the Joiner's triangle of TQM axioms. 3½
3. (a) What are four main stages in Deming cycle ? Describe each stage in brief. 3½
- (b) Discuss how time management affects quality. 3½

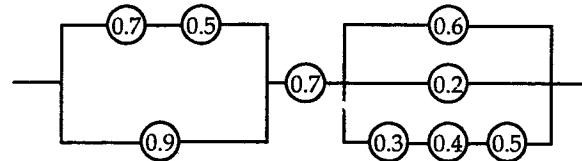
4. (a) What is quality manual ? Why is it required to maintain a quality management system in an organization ? $3\frac{1}{2}$
- (b) What are the major benefits of implementing ISO 9000 ? $3\frac{1}{2}$
5. (a) Describe Producer's risk and Consumer's risk with the help of Operating Characteristic (O.C.) curve. $3\frac{1}{2}$
- (b) Calculate the probability of acceptance of a lot containing 3% defective by a sampling plan with acceptance number 2 and sample size 100. $3\frac{1}{2}$
6. (a) Describe a quality control chart. How it can be used ? $3\frac{1}{2}$
- (b) A production manager at a tire manufacturing plant has inspected the number of defective tires in five random samples with 20 observations each. Following are the number of defective tires found in each sample :

Sample	Number of Defective Tires	Number of Observations Sampled
1	2	20
2	2	20
3	1	20
4	2	20
5	2	20
		100

Construct a three sigma control chart ($Z=3$) with this information.

7. (a) The average diameter of number of solid shafts is 60 mm with a standard deviation of 10 mm. The same measurement was carried out for diameter of 400 shafts and the average comes out to be 62 mm. The value of $Z_{\alpha=0.05}$ is 1.96. Is the difference significant ? 3½
- (b) Describe assignable and random causes of variability in the process. 3½
8. How are cause and effect diagrams useful in quality control ? Make a cause and effect diagram using dispersion analysis to solve the following problem : 7
- “A shaft for the compressor does not fit into the inner race of the bearing resulting in frequent rework”.
9. (a) What is system reliability ? Discuss the ways by which reliability of the system can be achieved. 3½
- (b) A system has a Mean Time Between Failures (MTBF) of 100 hr. If inherent availability is 91%, what would be Mean Time To Repair (MTTR) ? 3½

10. (a) What is maintainability ? How maintainability can be measured ? 3½
- (b) Determine the reliability of following system : 3½



11. (a) Describe hard needs and soft needs by giving suitable examples. 3½
- (b) What are essential elements of evaluation of the performance of a supplier during the execution of a contract ? 3½
12. Write short notes on **any two** of the following :
- (a) Bench marking 3½+3½
- (b) Activity based costing
- (c) ISO 14000
- (d) Poka-yoke