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TEC-033

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID: 0389

Roll No.

B. Tech.

(SEM. VIII) EXAMINATION, 2007-08 RELIABILITY AND QUALITY MANAGEMENT

Time: 3 Hours]

[Total Marks: 100

- Notes: (1) Attempt all five questions, choices are within.
 - (2) All questions carry equal marks.
 - (3) State clearly assumptions made if any. Assume missing data if any.
- 1 Attempt any two out of the following:

10x2 = 20

- (a) Define:
- (i) Failure rate and
- (ii) Hazard rate. Explain their application to the reliability of components and repairable systems. Discuss the plausibility of the 'Bathtubcurve' in both contexts.
- (b) Define reliability, quality and availability. What are the main causes of failures and unreliability? Explain in detail.
- (c) What is the effect of Higher Reliability and Quality on the performance and cost of any product? Examine in detail. Give suitable examples.

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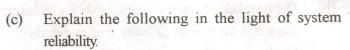
- (a) Expla hich you would expect ouserved and conform to an exponential distribution. What is the relationship between Poisson and Exponential distribution in reliability context.
- (b) What are the properties of 'Probability of Survival'.
 Establish a relationship among reliability, failure and MTBF.



10x2 = 20

- (c) Explain the following probability distribution
 - (i) Exponential distribution
 - (ii) Weibull distributions.
- 3 Attempt any two out of the following:
 - (a) What do you understand by Reliability Life Testing? What are the important considerations taken into account for performing these tests?
 - (b) What do you understand by Fault Tree Analysis?

 How it is carried out? What are the major steps involved in it? Construct a fault tree of a gas water heating system such that the top event is a safety-related failure.



- (i) System Redundancy
- (ii) Component Redundancy
- (iii) Mixed Redundancy.





- 4 Attempt any two of the following:
 - (a) Briefly describe three failure modes that can occur in modern integrated circuits. In each case explain how they are influenced by temperature, electrical stress and manufacturing quality.
 - (b) Discuss the reliability of electronics components as an overall contributor to system reliability in modern systems. Also discuss failure of solder connections.
 - (c) Describe any two methods for analysing the effects of component parameter variation on the performance of an electronic circuit. How the effects can be minimised.

5 Attempt any two of the following:

10x2

- (a) How is quality linked to cost of a product?

 What are the components of quality costs?

 Explain their effect on the total cost of production. What is quality policy?
- (b) What do you understand by TQM? Discuss its various features and principles. How is it related to reliability?
- (c) What do you know about ISO: 9000? What are the essential steps in quality system implementation in the light of ISO 9000?