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(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.

2 Attempt an ng: **10x2=20**

(a) Expl hich you would expect observed) 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.

(c) Explain the following probability distribution
(i) Exponential distribution
(ii) Weibull distributions.

3 Attempt any two out of the following: **10x2=20**

(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.

(c) Explain the following in the light of system reliability.
(i) System Redundancy
(ii) Component Redundancy
(iii) Mixed Redundancy.

4 Attempt any two of the following: **10x2=20**

(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?