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10MT82

Eighth Semester B.E. Degree Examination, June/July2023
Reliability and Fault Tolerance

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Distinguish between of quality and Reliability/* as applicable to products and concepts of and product systems. **(04 Marks)**

b. Define the following precisely
   i) Reliability
   ii) Availability
   iii) Maintainability. How do you achieve tradeoffs between these performance measures? **(08 Marks)**

c. Suppose severity compressors are observed at 5month intervals with the following number of failures 3, 7, 8, 9, 13, 18 and 12. Estimate R(t) F(t) and S(t). Determine sample mean to failure and sample standard deviation. **(08 Marks)**

2 a. Explain with any two examples the design for higher reliability. **(05 Marks)**

b. With example explain fault, tree analysis. **(10 Marks)**

c. What is FMECA? Explain. **(05 Marks)**

3 a. Define plant item and explain the principles of preventive maintenance. **(10 Marks)**

b. Describe different methods of maintenance approaches. **(10 Marks)**

4 Write short notes on:
a. Trend monitoring
b. Thermal monitoring
c. Lubrication maintainance
d. Vibration monitoring **(20 Marks)**

PART - B

5 a. Define redundancy. Distinguish between active and stand by redundancy. **(06 Marks)**

b. Clarify the meaning of the following with an example for each
   i) Common mode failures
   ii) Load sharing
   iii) Cold standby
   iv) Hot Standby
   v) Failure modes. **(10 Marks)**

c. Give the general procedure for redundancy allocation. **(04 Marks)**

6 a. Discuss fault tolerant communication system. **(10 Marks)**

b. Explain fault tolerant actuators. **(10 Marks)**

7 a. Define fault tree and how fault tree can be constructed. **(10 Marks)**

b. Describe product and equipment hazards. **(10 Marks)**

8 a. Explain how DC motor drives fault detection and diagnosis is done. **(04 Marks)**

b. Discuss fault detection and diagnosis of an automotive suspension and the tire pressures. **(16 Marks)**

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