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10MT82

Eighth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Reliability and Fault Tolerance

Time: 3 hrs.

Max. Marks:100

- Note:** 1. *Answer any FIVE full questions, selecting at least TWO questions from each part.*
2. *Show the working steps clearly.*
3. *Illustrative examples to be given wherever necessary.*

PART – A

- 1 a. Explain briefly with neat diagram failures and failure modes. (10 Marks)
b. Discuss the causes of failures and unreliability. (10 Marks)
- 2 a. Explain Redundancy techniques of design for reliability. (07 Marks)
b. Describe Failure modes , Effects and Criticality Analysis (FMECA). (06 Marks)
c. Explain Root cause analysis briefly. (07 Marks)
- 3 a. Define critical maintenance. Explain the basic model of the maintenance system. (04 Marks)
b. Explain briefly different types of maintenance approaches. (10 Marks)
c. Explain principles of preventive maintenance. (06 Marks)
- 4 a. Write short notes on : i) Trend monitoring ii) Lubrication maintenance. (12 Marks)
b. Describe Top – down Bottom Up (TIBU) approval to the formulation of maintenance strategy. (08 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. Explain briefly Fault tolerant control system and automatic fault management system. (12 Marks)
b. Explain about Fault tolerant actuator with suitable diagram. (08 Marks)
- 7 a. Outline the major phases of carrying at the system safety audit and analysis. How do the Hazard and operability analysis help in building system safety? (08 Marks)
b. Explain how do use the fault tree construction to carry out Quantitative and Qualitative evaluation of system safety. (08 Marks)
c. What is the role of analyzing human error during system safety analysis? (04 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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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.