

END SEMESTER EXAMINATIONS, NOVEMBER 2011  
B.E. Industrial Engineering (VIII Semester)  
IE482 RELIABILITY ENGINEERING

Duration:3 hours

Max. marks =100

**PART A (10x2=20 marks)**

*Answer all questions.*

1. Define mean life of a component.
2. What is meant by an m/n system?
3. What are the steps to be followed in software reliability estimation?
4. State the primary objectives of RCM.
5. Twenty switches were tested on a switching machine and observed for failure. The test was terminated after the fifth failure. The failure occurred at 1515h, 1976h, 4158h, 6262h and 8956h. Compute the point MTBF.
6. Name the classifications of replacement models.
7. Which distribution is more suitable for spare parts planning? Why?
8. Distinguish between 'a priori' and 'a posteriori' probability of failure.
9. State the limitations of employing a fault tree.
10. Name a few reliability improvement techniques.

**PART B (5x16=80 marks)**

*Answer all questions.*

11. Describe the application of Weibull distribution in reliability engineering.
- 12.A. The reliability of a complex system is  $R(t) = [t^2/t_0]^2$   $0 \leq t \leq t_0$   
Determine the failure rate.  
[OR]
- 12.B. Write short notes on the following:
  - i) Useful life
  - ii) Design life
- 13.A. A company is considering replacement of an equipment. The first cost of the equipment is Rs.4000 and the scrap value is negligible at any year. It is found from the experience, that the maintenance cost is zero during the first year and it increases by Rs.250 every year thereafter. When should the equipment be replaced?  
[OR]
- 13.B. Write short notes on:
  - i) Restorability demonstration
  - ii) Reliability allocation
- 14.A. Derive the reliability function of a two unit standby system.  
[OR]
- 14.B. Discuss the application of cut and tie sets method of estimating reliability with an example.
- 15.A. How will you conduct a detailed study on Probabilistic Risk Assessment in a leather industry?  
[OR]
- 15.B. Discuss about the application of HAZOP study in chemical industries.