B. E. (Seventh Semester)
EXAMINATION, Dec., 2014
EX-7101
Reliability Engineering

**Unit I**

1. Explain the basic concept of probability theory. What are the rules for combining probabilities of events ? Explain?

Or

2.What is Binomial and poisson distributions ? Explain expected value and standard deviation for continous and discrete distributions.

**Unit II**

3.(a) What are the different component reliability? Explain Hazard rate.

(b) A system has a constant failure rate of 0.001 failures per hour. What is the probability that this system will fail before t=1000hours? Determine the probability that it will work for at least 1000hours.

Or

4(a) What is reliability?

(b) Explain in detail the different techniques employed in improving the reliability.

(c) Determine the time terminated, with replacement mean life sampling plan where the producers risk of rejecting lots with mean life of 800hours is 0.05 and the consumer's risk of accepting lots with Mean life of q1=220 hours is 0.01. The sample size is 30.

**Unit-III**

5 Two nickel-cadmium batteries provide electrical power to operate a satellite transceiver. If both batteries are operating in parallel, they have an individual failure rate of 0.1 per year. If one fails, the other can operate the transceiver ( at a reduced power output ) However, the increased electrical demand will triple the failure rate of the remaining battery. Determine the system reliability at 1,2,3,4 and 5 year . What is the system MTTF?

Or

6. A pumping station has two identical pumps connected in parallel, each capable of supplying 3000 gallons/hr. The failure rate and repair rate of each is 0.5f/hr and 4r/hr respectively. Evaluate the frequency of encountering and duration of residing in each possible throughput state.

**Unit-IV**

7. (a) A series system has 10 identical components. If overall system reliability must be at least 0.99, What is the minimum reliability required of each component?

(b) Define Minimal cut-set . Explain the reliability analysis of complex systems using minimal cut-set method.

Or

8 Explain the network reduction / solution techniques used in approximate system reliability evaluation.

**Unit-V**

9. Determine the reliability of system using event tree diagram if four sub-systems are connected in series and management considers the system giving satisfactory performance even if two out of four units remain out of order. The failure rate of each subsystem is 1 in 2000 and working hour are 400.

Or

10. Write short notes on any two of the following:

a) Reliability testing
b) Parametric methods
c) Failure function and MTTF
d) Markov process