Code No: 138GU **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, September - 2020
RELIABILITY ENGINEERING
(Electrical and Electronics Engineering)

Time: 2 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks

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1.a) What is hazard rate? Explain with example.
b) How would you explain the Bath Tub curve? [7+8]

2.a) How would you define Reliability and explain what are the important aspects of the definition of reliability needs careful consideration?
b) In a certain manufacturing process, one percent of the products are known to be defective. If 50 items are purchased by a customer, what is the probability of getting two or less number of defectives? Use Poison distribution to solve the problem. [8+7]

3. How would you calculate the reliability of the bridge Network using Minimal Cut Set method as shown in figure 1. If each component reliability is 0.9? [15]

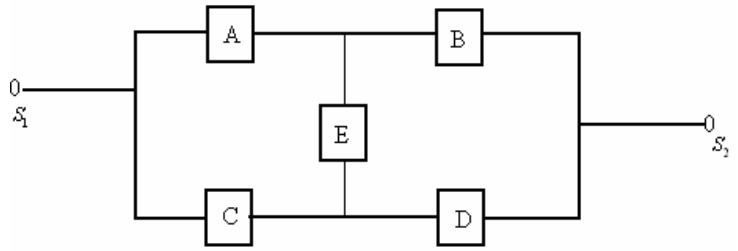

Figure 1

4. How would you calculate the reliability of the above system with Network reduction method as shown in figure 2? [15]

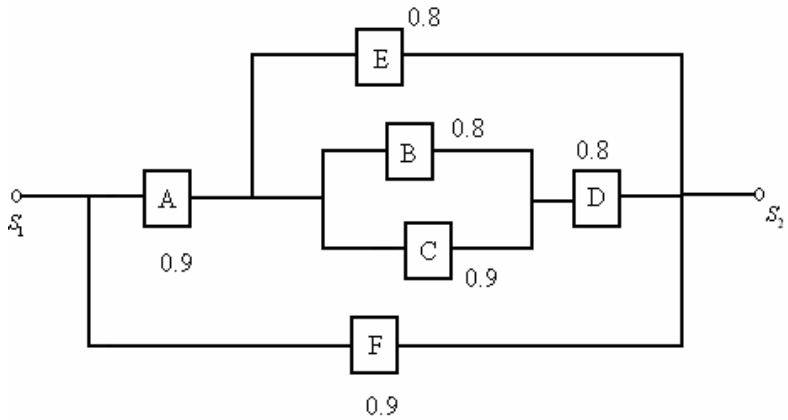

Figure 2

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5. Three components having reliabilities 0.8, 0.85 and 0.9 are connected in parallel
a) What is the overall reliability of the system?
b) If another component of reliability 0.7 is connected in series to this system, What is the reliability of the resultant system? [15]

6. 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? [15]

7a) How would you define Mean cycle time, and how it can be calculate for one and two component repairable model?
b) How would you explain about stochastic state transitional probability matrix of three state system? [8+7]

8.a) How would you explain the frequency and duration concept?
b) How would you describe the Network reduction technique for Reliability Evaluation?[7+8]

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