

Code No: 138EM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, September - 2020

RELIABILITY ENGINEERING

(Electronics and Instrumentation Engineering)

Time: 2 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks

- - -

- 1.a) Illustrate the interrelationship between Binomial Distribution and Poisson distribution.
- b) Derive an expression for Expected value of Binomial Distribution. [8+7]
- 2.a) Explain normal distribution and derive an expression for probability density function of normal distribution.
- b) Illustrate Bath tub curve with an example. [8+7]
- 3.a) A network is made up of four independent units representing a system shown in Fig. 1. Each block in the figure denotes a unit. The reliability of R of each unit is given. Calculate the network reliability by using the network reduction method.

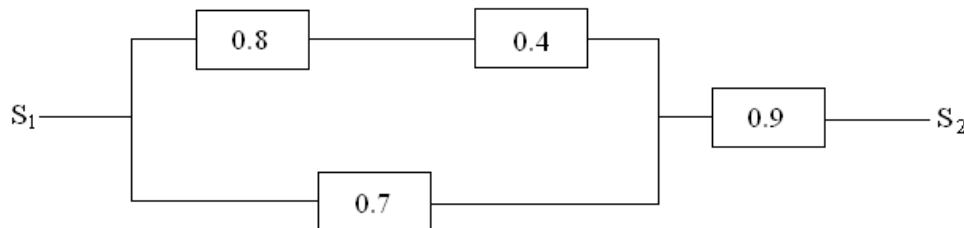


Fig. 1

- b) Write the procedural steps in Conditional probability method. [8+7]
4. Derive the expression for reliability of the system shown in Fig. 2 using Tie set method, and hence calculate Reliability Index of the system, if each component has a reliability of 0.92. [15]

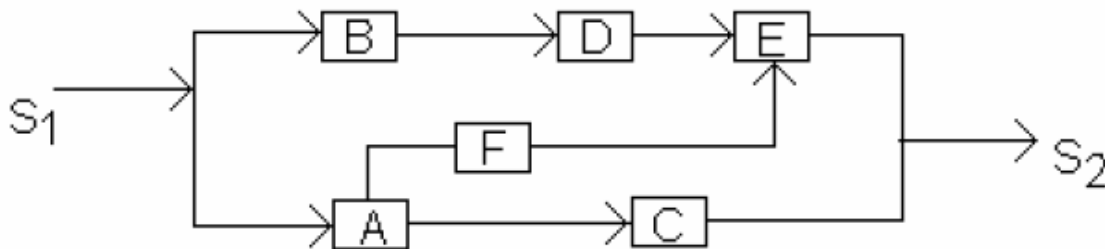


Fig. 2

- 5.a) Derive the Relationship between $f(t)$, $F(t)$, $R(t)$ and $h(t)$.
- b) Explain the reliability evaluation of '2' and '3' component Series System using exponential distribution. [8+7]

6. For the reliability logic diagrams shown in Fig. 3 (a) and Fig. 3 (b). Find the symbolic reliability, expression using exponential distribution and hence obtain the reliability index of the system if each component has a failure rate of 4 failures/year. [15]

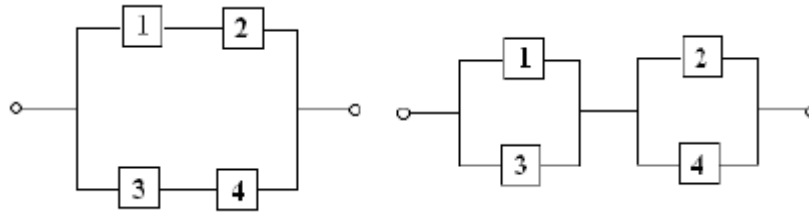


Fig.3 (a)

Fig.3 (b)

7. Draw the complete and combined state space diagrams and hence derive the expressions for Unreliability of two component repairable systems. [15]
- 8.a) Explain Approximate System Reliability Evaluation of parallel system.
 b) Apply Network reduction method to obtain the Basic Probability Indices of the system shown in Fig. 4. All components are identical and have a failure rate of 0.05 f/yr and an average repair time of 20 hours. [8+7]

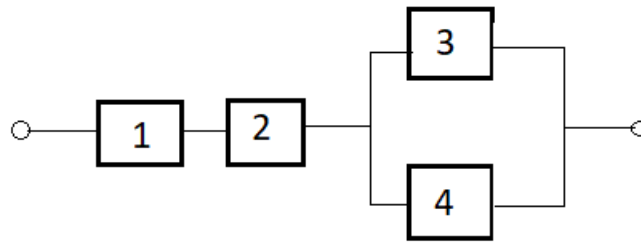


Fig. 4

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