Department of Electrical and Computer Engineering
University of Massachusetts Dartmouth

ECE544 Fault-Tolerant Computing & Reliability Engineering

Fall 2022

Homework #5

Name: _____

Instructor: Prof. Liudong Xing

ECE544: Fault-Tolerant Computing & Reliability Engineering
(Fall 2022)
Homework #5

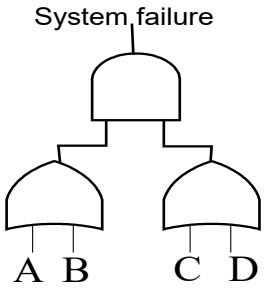
Assigned: **October 24, Monday**
Due: **October 31, Monday, 3:30pm**

Instructions:

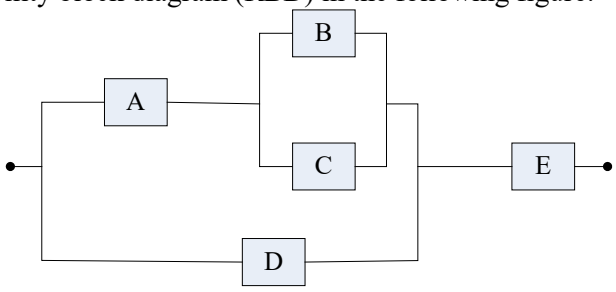
1. Please type your answers or write your answers clearly (illegible writing will NOT be graded).
2. Please organize all pages of your answers into one file, name your file using **"HW5-your last name.pdf or doc"** (e.g., HW5-Xing.pdf), and submit it to lxing@umassd.edu electronically or submit a hard copy by the due date.
3. **Relevant lectures: Lecture #9 & 11**

Problems:

1. Given the fault tree model of a system,
   a) Find the equivalent reliability block diagram.
   b) Find all the minimal cut sets.
   c) Find all the minimal path sets.
   d) Assume the failure probability of each component is: A: 0.01, B: 0.2, C: 0.03, D: 0.1. Find the system reliability



2. Consider the reliability block diagram (RBD) in the following figure.



   a) Convert the diagram into an equivalent fault tree.
   b) Find all the minimal path sets.
   c) Find all the minimal cut sets.
   d) Assume the **failure probability** for each component is 0.1. Find the system reliability at time t=10 hours.
   e) Assume the **failure rate** for each component is 0.1/hour. Find the system reliability at time t=10 hours.