Name _____

✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠

57:022 Principles of Design II - Quiz #7

Spring 2002

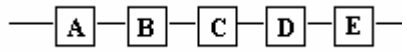
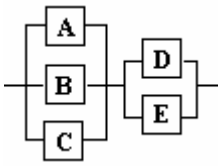
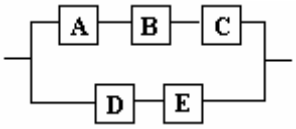
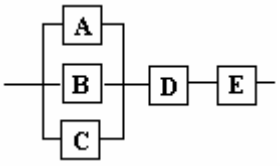
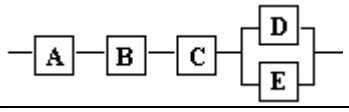
✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠ ✠

Five components (A,B,C,D, & E) are available for constructing a system. The probability that each component *survives* the <u>first</u> year of operation is

- 70% for A, B, & C
- 80% for D & E.

For each system (1) through (5) below:
For each of these three scenarios (a,b,c), indicate whether the system will **F**ail or **S**urvive ***(write "F" or "S" in the table):***:

(i) only components A and C fail.
(ii) only components B and D fail.
(iii) only components C, D, & E fail.

System #	Diagram	Scenario (i)	Scenario (ii)	Scenario (iii)	**Reliability**
1					
2					
3					
4					
5					

For each system (#1-5) above, write the letter below indicating the ***computation*** of the 1-year reliability (i.e., survival probability):

a. $1 - (0.3)^3(0.2)^2 = 0.99892$
b. $1 - [1 - (0.7)^3][1 - (0.8)^2] = 0.76348$
c. $[1 - (0.3)^3]\,[1 - (0.2)^2] = 0.93408$
d. $(0.7)^3(0.8)^2 = 0.21952$
e. $(0.7)^3[1 - (0.2)^2] = 0.32928$
f. $1 - (0.3)^3[1 - (0.8)^2] = 0.99028$
g. $[1 - (0.3)^3]\,(0.2)^2 = 0.03892$
h. $[1 - (0.3)^3]\,(0.8)^2 = 0.62272$
i. $1 - (0.3)^3[1 - (0.8)^2] = 0.99028$
j. *None of the above*