

## 22.38 PROBABILITY AND ITS APPLICATIONS TO RELIABILITY, QUALITY CONTROL AND RISK ASSESSMENT

Fall 2005

### PROBLEM SET #2

Due Oct. 4, 2005

1. Consider three students taking an examination. Their respective probabilities of obtaining the different available grades are shown in Table 1. What is the probability that each will obtain a grade of A? If two students were to receive an A, what is the probability that Jim would be among them?

System success requires that at least two students receive grades of A on each of two successive examinations (a requirement under the “no child left behind” Act). What is the structure function for the top event, T, where T = system success? What is the value of Prob.(T)?

Table 1. Probabilities of Individual Student Exam Grades\*

Student	Grade				
	A	B	C	D	F
Tom	0.5	0.3	0.1	0.06	0.04
Jim	0.4	0.4	0.1	0.07	0.03
Sam	0.3	0.3	0.3	0.05	0.05

\* Assume each examination outcome to be independent.

2. What is the structure function for the top event, T, where T = system success for the fuel pumping system discussed in class?

Ang & Tang: Problems 2.2, 2.5, 2.9, 2.18, 2.27

Rausand & Hoyland: 3.4, 3.17