**King Fahd University of Petroleum & Minerals**

**Serial #**

- 1 points for not writing your serial number

Electrical Engineering Department

EE315: Probabilistic Methods in Electrical Engineering (112)

**Quiz 1: Probability**

Name: Key Sec.

Fill in the table as (T) True or (F) False

a) *A*={1,2,3} is a proper set of *B*={all integers greater than zero and less than 4}.

b) The null set is a subset of all other sets.

c) For a universal set with 3 elements, there is a total 8 possible subsets.

d) $P\left(A∪B\right)=P\left(A\right)+P(B)$

e) $P\left(B\right)=\frac{P\left(A\right)P\left(A\right)}{P\left(B\right)}$

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question** | a | b | c | d | e |
| **T or F** | F | T | T | F | T |

A company producing electric switches has three manufacturing plants 50, 30 and 20 percent, respectively, of its products. Suppose that the probabilities that a switch manufactured by these plants is defective are 0.02, 0.05, and 0.01, respectively.

a) If a switch is selected at random from the output of the company, what is the probability that it is defective?

Let *B* be the event that the switch is defective, and let *Ai* be the event that the switch is manufactured by plant *i* (*i*=1,2,3). The desired probability is *P*(*B*), using total probability

$$P\left(B\right)=\sum\_{i=1}^{3}P\left(A\_{i}\right)P\left(A\_{i}\right)=\left(0.02\right)\left(0.5\right)+\left(0.05\right)\left(0.3\right)+\left(0.01\right)\left(0.2\right)=0.027$$

b) If a switch is selected at random from the output of the company, what is the probability that it is not defective?

$$P\left(\overbar{B}\right)=1-P\left(B\right)=1-0.027=0.973$$

c) If a switch selected at random is defective, what is the probability that it was manufactured by plan 2.

The desired probability is $P\left(B\right)=\frac{P\left(A\_{2}\right)P\left(A\_{2}\right)}{P\left(B\right)}=\frac{\left(0.05\right)\left(0.3\right)}{0.027}=0.556$

 Good Luck, **Dr. Ali Muqaibel**