

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
ELECTRICAL ENGINEERING DEPARTMENT

EE 315

Quiz #2

Name: Solution

ID#: _____

Section No: _____

Q1: Twenty percent of items from a certain production line are defective. What is the probability that there is more than one defective item in a batch of ten items?

$$p = 0.2$$

$$P[k > 1] = 1 - P[k \leq 1]$$

$$= 1 - P[k=0] - P[k=1]$$

Here, $n=10$ and $P[k] = \binom{n}{k} p^k (1-p)^{n-k}$

$$\text{Hence, } P[k=0] = \binom{10}{0} (0.2)^0 (1-0.2)^{10}$$

$$\text{and } P[k=1] = \binom{10}{1} (0.2)^1 (1-0.2)^9$$

Therefore, calculating all these terms will result in the probability that there is more than one defective item in a batch of ten items:

$$\begin{aligned} P[k > 1] &= 1 - (0.8)^{10} - 10(0.2)(0.8)^9 \\ &= \underline{\underline{0.624}} \end{aligned}$$