KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 319: Probability & Statistics for Engineers & Scientists
Semester 151
First Major Exam
Wednesday September 16, 2015
6:00 – 7:15 pm

Please encircle your instructor name:

Abbas Al-Sawi Anabosi

Malik Riaz Samouh

Name: ID #: Section #: Serial #:

Question No	Full Marks	Marks Obtained
1	**8**	
2	**8**	
3	**7**	
4	**6**	
5	**6**	
Total	**35**	

Q.No.1 (3+3+2=8 points):- The number of arrivals at a local gas station between 3:00 and 5:00 P.M. has a Poisson distribution with a mean of 12.

a. Find the probability that the number of arrivals between 3:00 and 5:00 P.M. is at least 1.

b. Find the probability that the number of arrivals between 3:30 and 4:00 P.M. is at most 1.

c. Find variance for the number of arrivals between 4:00 and 5:00 P.M.

Q.No.3 (3+3+2=8 points):- Suppose that of all individuals buying a certain personal computer, 60% include a word processing program in their purchase, 40% include a spreadsheet program, and 30% include both types of programs. Consider randomly selecting a purchaser and let A = (word processing program included) and B = (spreadsheet program included).

a. Find the probability that a word processing program or a spread sheet program was included.

b. Find the probability that a word processing program was included given that the selected individual included a spreadsheet program.

c. Are A and B independent? How? Justify your answer.

Q.No.3 (2+5=7 points):- A company has 2 machines that produce widgets. An older machine produces 23% defective widgets, while the new machine produces only 8% defective widgets. In addition, the new machine produces 3 times as many widgets as the older machine does.

a. Given that a widget was produced by the new machine, what is the probability it is not defective?

b. Given that a widget is not defective, what is the probability it was produced by the new machine?

Q.No.4 (3+3=6 points):- A day's production of 12 manufactured parts contains 3 parts that do not meet customer requirements. Three parts are selected randomly without replacement from the batch.

a. Find the probability that the first part is not defective and the 2^{nd} and 3^{rd} are defective.

b. Find the probability that any two (out of three selected) parts are defective.

Q.No.5 (3+3=6 points):- The probability that a patient recovers from a delicate heart operation is 0.8. For the next three patients who have this operation:

a. What is the probability that exactly 2 patients survive?

b. What is the average number of survived patients?