KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

DHAHRAN, SAUDI ARABIA

STAT 211: BUSINESS STATISTICS I

Semester 131
Major Exam Two
November 4, 2013
Allowed time 60 minutes

Please check/circle your instructor's name

MUHAMMAD RIAZ	Section 03 (9:00am – 9:50am)
MOHAMMED SALEH	Section 05 (11:00am – 11:50am)

Name: Student ID#: Serial #:

Directions:

1) You must **show all work** to obtain full credit for questions on this exam.
2) **DO NOT round** your answers at each step. Round answers only if necessary at **your final step to 4 decimal places**.
3) You are allowed to use electronic calculators and other reasonable writing accessories that help write the exam. Try to define events, formulate problem and solve.
4) Do not keep your mobile with you during the exam, turn off your mobile and leave it aside

Question No	Full Marks	Marks Obtained
Q1	*10*	
Q2	*7*	
Q3	*3*	
Q4	*5*	
Q4	*5*	
Total	*30*	

Question One:

According to a recent market research survey conducted on behalf of a general insurance group, 30% of houses with both swimming pool and parking, 50% with swimming pool and 60% with parking.

1. What is the probability that a house, chosen at random, with swimming pool, or parking, or both? ***(2 pts)***

2. What is the probability that a house, chosen at random, without swimming pool but with parking? ***(2 pts)***

3. What is the probability that a house, chosen at random, with swimming pool given that it has parking? ***(2 pts)***

4. Let the two events ***A***: the house with swimming pool, ***B***: the house with parking
   a. Are they mutually exclusive? Explain. ***(2 pts)***

   b. Are they independent? Explain. ***(2 pts)***

Question Two

It is known that screws produced by a certain company will be defective with probability 10%.

1. If you keep selecting screws until the first defective screw, what is the probability that the first defective screw is the 6^{th} one. ***(2 pts)***

2. (***2 points***) If the company sells the screws in packages of 10, what is the probability that the first two screws are defective? ***(2 pts)***

3. (***2 points***) If the company sells the screws in packages of 10, and offers money – back guarantee at most 1 of the 10 screws is defectives, what proportion of packages sold must the company replace? ***(3 pts)***

Question Three

The number of flaws in bolts of cloth in textile manufacturing is assumed to be Poisson distributed with a mean of 0.1 flaw per square meter. What is the probability that there are at least two flaws in 10 square meters of cloth? ***(3 pts)***

Question Four

A certain type of component is packed in lots of four. Let X represents the number of properly functioning components in a randomly chosen lot. Assume that the probability that exactly x components function is proportional x; in other words, assume that the probability mass function of X is given by

$$P(X = x) = \begin{cases} \alpha\, x & x = 1, 2, 3, or\ 4 \\ 0 & otherwise \end{cases}$$

Where α is a constant

1. Find the value of the constant α so that $P(X = x)$ is probability mass function. ***(2 pts)***

2. Find the expected value and standard deviation of the number of properly functioning components ***(2 pts)***

3. Find probability that more than two properly functioning components. ***(1 pt)***

Question Five

A manufacturer makes two models of an item:
Model I, which accounts for 80% of the unit sales.
Model II, which accounts for 20% of the unit sales.
Because of defects, manufacturer has to replace (or exchange) 10% of its model I and 18% of its model II.

4. If a unit is selected at random, find the probability that it will be defective. ***(3 pts)***

5. Given that the selected unit is defective, what is the probability that the unit from model I? ***(2 pts)***