KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

DHAHRAN, SAUDI ARABIA

STAT 211: BUSINESS STATISTICS I

Semester 131

Final Exam

December 31, 2013

Allowed time 120 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	2	
Q2	2	
Q3	2	
Q4	5	
Q5	3	
Q6	6	
Q7	9	
Q8	11	
Q9	10	
Total	50	

Q1: The probability that house sales will increase in the next 6 months is estimated to be 0.25. The probability that the interest rates on housing loans will go up in the same period is estimated to be 0.75. The probability that house sales or interest rates will go up during the next 6 months is estimated to be 0.89. Find the probability that both house sales and interest rates will increase during the next 6 months is. (2 *points*)

Q2: A campus program evenly enrolls undergraduate and graduate students. If a random sample of 4 students is selected from the program to be interviewed about the introduction of a new fast food outlet on the ground floor of the campus building, what is the probability that at most 3 students selected are undergraduate students? (*2 points*)

Q3: A debate team of 4 members for a high school will be chosen randomly from a potential group of 15 students. Ten of the 15 students have no prior competition experience while the others have some degree of experience. What is the probability that exactly half of the members chosen for the team have some prior competition experience? (*2 points*)

Q4: Telephone calls arrive at the information desk at a rate of 20 per hour.

1. What is the probability that there are 2 calls in the next fifteen minutes? (*2 points*)

2. What is the probability that the arrival time between consecutive calls is less than 3 minutes? (*3 points*)

Q5: A lab orders 100 rats a week for each of the 52 weeks in the year for experiments that the lab conducts. Prices for 100 rats follow the following distribution:

Price	$10	$12.5	$15
Probability	0.35	0.4	0.25

How much should the lab budget for next year's rat orders be, assuming this distribution does not change?

(*3 points*)

Q6: An apple juice producer buys all apples from a large apple orchard that has one variety of apples. The amount of juice squeezed from these apples is approximately normally distributed with mean 7 ounces and a standard deviation of 0.5 ounces. Suppose that you select a sample of size 30 apples.

1. What is the probability that the sample mean amount of juice will be at least 6.9 ounces? (*3 points*)

2. The probability is 80% that the sample mean amount of juice will be greater than what value? (*3 points*)

Q7: Most major airlines allow passengers to carry two pieces of luggage onto the plane. One regional airline is considering changing its policy to allow only one carry – on per passenger. Before doing so, it decided to collect some data. A random sample of size 1000 passengers was selected and number of bags carried on the plane was noted. 345 passengers had more than one bag.

1. Based on this sample, develop and interpret a 95% confidence interval estimate for the proportion of the traveling population that would have been impacted had the "one – bag" limit been in effect. (*5 points*)

2. The domestic version of Boeing 747 has a capacity for 568 passengers. Determine a 95% confidence interval of the number of passengers that you expect to carry more than one piece pf luggage on the plane. Assume the plane is at its passenger capacity. (1 *point*)

3. Suppose the airline decides to conduct a survey of its customers to determine their opinion of the proposed "one- bag" limit. One key question on the survey will be: "Do you approve of limiting the number of carry – on bags to a maximum of one bag?" Airline managers expect that only 15% will say yes. Based on this information, what size sample should the airline take if it wants to develop a 98% confidence interval estimate for the population proportion who will say "yes" with margin of error ± 0.02? (*3 points*)

Q8: The quality manager for a major automobile manufacturer is interested in estimating the mean number of paint defects in cars produced by the company. He wishes to have its estimate be within ± 0.3 of the true mean and wants a 97% confidence in the estimate. He does not know what the population standard deviation, so he selects a pilot sample of size 18

0	1	2	7	0	0	2	8	1
1	3	5	2	1	2	3	2	4

1. Calculate the mean and the standard deviation for the pilot sample. (*3 points*)

2. How many additional cars need to be sampled to provide the estimate required by the quality manager? (*3 points*)

3. Constrict a 99% confidence interval estimate for the mean number of paint defects in cars produced by the company. What assumptions did you make, if any? (*5 points*)

Q9: The prices of two competitive companies (Company I and Company II) need to be studied in order to have a comparative analysis between the two companies. The following prices data have been obtained for these two types of companies from a town market:

	Company I	Company II
The sample size	15	17
The sample mean	33.4	32.4
The sample standard deviation	1.3	1.5

1. Compute and interpret a 93% confidence interval for the difference between the true mean prices of two companies. What assumptions did you make, if any? (*9 points*)

2. According to your answer above, do you think that there is a difference between the true mean prices of two companies? (*1 point*)