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

STAT 211: Statistics for Business I
Semester 171, Second Major Exam
Wednesday November 29, 2017 (7:00 pm)

Please circle your instructor's name:

Abbas   Anabosi   Marwan   Saleh

Name:_____ ID#:_____Section#:____ Serial#:____

Question No	Full Marks	Marks Obtained		Question No	Full Marks	Marks Obtained
1	**04**			6	**04**	
2	**04**			7	**04**	
3	**04**			8	**08**	
4	**06**			9	**06**	
5	**07**			10	**05**	
Total (out of 52)						

Instructions:

1. Formula sheet and statistical tables will be provided to you in exam. You are not allowed to bring, with you, formula sheet or any other printed/written paper.

2. Mobiles are not allowed in exam. If you have your **mobile** with you, **turn it off** and put it **under your seat** so that it is visible to proctor.

3. For every question, show all the calculation steps. There are points for the steps so if your miss them, you would lose points.

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Note: Read all the instructions (on first page) carefully before starting the exam.

Q.No.1: - (4 points) A manufacturer of metal pistons finds that 12% of his pistons are rejected because they are either oversize or undersize. A batch of 10 pistons is selected, find the probability that it contains no more than two rejects.

Q.No.2: - (4 points) A life insurance salesperson sells on the average 3 life insurance policies per week. Assuming that there are 5 working days per week, what is the probability that in a given day he will sell one policy?

Q.No.3: - (4 points) Five buses carrying 200 students from the same school arrive at the football stadium. The buses carry, respectively, 20, 30, 40, 50 and 60 students. One of the students is randomly selected. Let X denote the number of students who were on the bus carrying the randomly selected student. Find the probability mass function of the random variable X and from there evaluate the expected value X.

Q.No.4: - (3+3 = 6 points) A baker makes 4 cakes on a given day. Let X be a random variable referring to the number of cakes sold per day.

(a) The baker estimate the random variable has the probability mass function
$$P(X = x) = \frac{1}{12} + \frac{x}{16}, \qquad x = 0, 1, 2, 3, 4$$
Is this a valid probability mass function? Use probabilistic justification.

(b) A friend of the baker estimate the random variable has the probability mass function
$$P(X = x) = \frac{x}{8} - \frac{1}{20}, \qquad x = 0, 1, 2, 3, 4$$
Is this a valid probability mass function? Use probabilistic justification.

Q.No.5: - (3+4 = 7 points) It has been determined that the weight of bricks made by a company is uniformly distributed between 1 and 1.5 pounds.

(a) What is the probability that a randomly selected brick will weigh less than 1.2 pounds?

(b) 90% of the bricks are heavier than how many pounds?

Q.No.6: - (4 points) It is assumed that the time to failure of an electronic component is exponentially distributed with a mean of 50 hours. Given that a randomly selected component did not fail in the first 20 hours, what is the probability it will fail within next 40 hours?

Q.No.7: - (4 points) A factory employs several thousand workers, of whom 30% are from non-English speaking background. If 9000 members of the union executive committee were chosen from the workers at random, evaluate the probability that more than 6250 members of the committee are English speaking background people.

Q.No.8: - (2+1+2+3 = 8 points) In 2008, the per capita consumption of coffee in the United States was reported to be 9.24 pounds. Assume that the per capita consumption of a coffee in the United States is approximately distributed as normal with a mean of 9.24 pounds and a standard deviation of 3 pounds.

(a) What is the probability that someone in the United States consumed less than 22 pounds of coffee in 2008?

(b) What is the probability that someone in the United States consumed 9 pounds of coffee in 2008?

(c) What is the probability that someone in the United States consumed between 4 and 7 pounds of coffee in 2008?

(d) 97% of the people in the United States consumed less than how many pounds of coffee?

Q.No.9: - (2+4 = 6 points) Suppose that the starting salary (in \$1000) for this year's graduates at a Brock University (BU) has a probability density function

$$f(x) = \begin{cases} \dfrac{x}{4}, & 1 < x < 3 \\\\ 0, & \text{otherwise} \end{cases}$$

Any fresh graduate from Brock University having a salary more than \$2500 is considered to have a high salary.

(a) Find the probability that a randomly selected graduate from this year's graduates of BU has a high salary.

(b) If a sample of 100 graduates from this year's graduates of BU is selected, what is the probability that the proportion of graduates having high salaries is more than 0.3?

Q.No.10: - (5 points) Past sales records indicate that sales at the store are exponentially distributed with a mean $12.5 per customer. The store manager has selected a random sample of 100 sales receipts. Find the probability of getting a sample mean between $12.25 and $13 from this population.

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Best of Luck