KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA
STAT 211: BUSINESS STATISTICS I

Semester 112
Major Exam Two
Tuesday April 17, 2012

Please **circle** your:
Instructor's name and Section (time)

Mohammed F. Saleh	1 (8:00 – 8:50)	2 (9:00 – 9:50)	4 (11:00 – 11:50)
Mohammad H. Omar	3 (10:00 – 10:50)		

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	15	
Q2	10	
Q3	10	
Q4	10	
Q5	6	
Q6	9	
Total	60	

Question One (2+4+6+3 = 15 points)

A Sample of 500 respondents was selected in a large metropolitan area to study costumer behavior. Among the questions asked was “Do you enjoy shopping for clothing” of 240 males, 136 answered yes. Of 260 females 224 answered yes.

1. Construct a contingency table

2. What is the probability a respondent chosen at random

a) Is a female or enjoys shopping for clothing?

b) Is a male or female?

3. Let **Y**: respondent enjoys shopping for clothing and **M:** the respondent male

a) Are the two events ***independent***? Explain using probability

b) Are the two events ***mutually exclusive?*** Explain using probability

c) Are the two events ***collectively exhaustive***? Explain using probability

4. If the respondent *not* enjoys shopping for clothing, what is the probability that the respondent is male?

<u>Question Two (1+4+5 = 10 points)</u>

The Japanese automobile company Lexus has established a reputation for quality control. Recent statistics indicate that a newly purchased Lexus ES 300 will have

Defects (X)	0	1	2	3	4	5
Probability	0.12	0.18	0.25	a	0.15	0.10

If you purchase a new Lexus ES 300, find

1. The probability that it will have two or four defects

2. If the Lexus have more than two defects, find the probability that it have less than four defects.

3. Computer the expected value and the standard deviation of number of defects

Question Three (3 +5+2 = 10 points)

A multiple - choice examination has four possible answers for each of ten questions. If X represents a random variable counting the number of the correct answers just by guessing

1. Find the probability distribution of the random variable X.

2. Find the probability that a student will get more than one correct answers just by guessing.

3. Find the probability that a student will get the first two questions correct just by guessing.

Question Four (2+5+3 = 10 points)

The life of a certain automobile tire is normally distributed with mean 35 thousand mile and standard deviation 5 thousand miles.

1. What is the percentage of such tires last over 40 thousand miles?

2. If the tire still working after 30 thousand mile, what is the percentage that its life exceeds 40 thousand miles?

3. 10% of these tires will have a life above how many miles.

<u>Question Five (3+3 = 6 points)</u>

Customers arrive at the drive – up window of a fast – food restaurant in Al – Dhahran at rate 4 per minute during the lunch hour.

1. What is the probability that there are at least one customer will arrive in the next 2 minutes?

2. What is the probability that the next customer will arrive within 2 minutes?

<u>Question Six (4+5 = 9 points)</u>

The bid that a competitor makes on a real estate property is estimated to be somewhere between 0 and 3 million dollars. Specifically, the bit X is viewed to be a continuous random variable with density function

$$f(x) = c\left(9 - x^2\right) \quad for \quad 0 < x < 3$$

1. Find the value of **c** that makes the function a density function.

2. Find the expected value for the competitors bid.

Some Useful Formulas

- **Binomial:** $P(x) = C_x^n \pi^x (1-\pi)^{n-x}$, $\mu = E(X) = n\pi$, $\sigma = \sqrt{n\pi(1-\pi)}$
- **Poisson:** $P(x) = \frac{(\lambda t)^x e^{-\lambda t}}{x!}$, $\mu = \lambda t$, $\sigma = \sqrt{\lambda t}$
- **Hyeprgeometric:** $P(x) = \frac{C_{n-x}^{N-X} C_x^X}{C_n^N} = \frac{\binom{N-A}{n-x}\binom{A}{x}}{\binom{N}{n}}$
- **Exponential:** $P(0 \le x \le a) = 1 - e^{-\lambda a}$
- $P(E_1 \text{ or } E_2) = P(E_1) + P(E_2) - P(E_1 \text{ and } E_2)$
- $P(E_1 | E_2) = \frac{P(E_1 \text{ and } E_2)}{P(E_2)}$
- $\mu_x = E[X] = \sum_{\text{all x}} x_i P(x_i)$ or $\mu_x = E[X] = \int xf(x)dx$
- $E[X^2] = \sum_{\text{all x}} x^2 P(x)$ or $\mu_x = E[X^2] = \int x^2 f(x)dx$
- $\sigma_x^2 = E[X^2] - \mu_x^2$
- $\sigma_{xy} = \sum_{i=1}^{n} (x_i - E[X])(y_i - E[Y])P(x_i \text{ and } y_j)$