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

Semester 111
Major Exam Two
Wednesday Nov 23, 2011
Allowed time 110 minutes

Please **circle** your:

Instructor	**section number**		
MOHAMMAD OMAR	Sec 1: (7:00 – 7:50)	Sec 2 : (8:00 – 8:50)	Sec 6 : (11:00 – 11:50)
MOHAMMED SALEH	Sec 3: (9:00 – 9:50)		

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	5	
Q2	5	
Q3	5	
Q4	4	
Q5	9	
Q6	6	
Q7	6	
Q8	10	
Total	50	

Question One (1+2+2=5 points)

Given that for a standard normal distribution, $P(Z > 1) = 0.1587$ find:

1. $P(Z < 1) =$

2. $P(-1 < Z < 0) =$

3. $P(-1 < Z < 1) =$

Question Two (2+3= 5 points)

A gathering contained 15 students, six of whom were finance, five where management and the rest were accounting majors. If three of these students were selected at random to give a speech to the group,

1. What is the probability that the three would consist of one finance, one management and one accounting majors?

2. What is the probability that the first and second are finance majors?

Question Three (5 points)

A free–lance plumber has collected the following data of his daily work demand (number of times called per day):

Demand	0	1	2	3	4
Probability	0.10	0.40	0.25	0.15	0.10

If he charges $40 fee per call (flat fee plus parts), find the mean and the variance of his daily fees

Question Four (4 points)

A credit card company knows that 70% of its customers are males. The company is considering randomly selecting 60 people each year to receive a free vacation. Find the probability that in a given year more than 40 males will be selected.

Question Five (3+3+3=9 points)

Suppose personal daily water usage in Al – Dammam is normally distributed, with mean 18 gallons and standard deviation of 6 gallons.

1. What is the percentage of the population that uses more than 22 gallons?

2. What is the percentage of the population that uses between 10 and 22 gallons?

3. Because of a perpetual water shortage, the governor wants to give a tax rebate to the 20% of the population who use the least amount of water. What should the governor use as the maximum water limit for a person to qualify for the tax rebate on water?

Question Six (2+4=6 points)

Three items are randomly sampled off a production line, with each item being classified as defective or nondefective. From past data it has been determined that one out of 10 items is defective. If X represents a random variable counting the number of defectives in a given sample,

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

2. Find the probability that there are no more than two defectives in the sample, given that more than one defective item is in the sample?

Question Seven (2+4=6 points)

The manager of a local convenience–food and gasoline store observed on average 4 customers failing to pay for their gasoline per week.

1. Find the probability that no customers fail to pay during a month.

2. Find the probability that the time between any 2 customers who fail to pay is less than 2 days.

Question Eight (10 points)

(Part a) Choose the correct answer

1. A population frame for a survey contains a listing of 6,179 names. Using a table of random numbers, which of the following code numbers can appear on your list?
   a. - 06
   b. 0694
   c. 6946
   d. 61790
   e. All the above

2. The customer service manager of a major consumer electronics company is interested in determining whether over the past 12 months, customers who have purchased a videocassette recorder made by the company are satisfied with their purchases. If the company made 4 different brands of videocassette recorders, the best sampling strategy would be to use a
   a. a simple random sample.
   b. a cluster sample.
   c. a systematic sample.
   d. a stratified sample.
   e. None of the above

3. For cluster sampling, which of the following is NOT true?
   a. Only the selected clusters are studied
   b. The main objective is to reduce cost by increasing sampling efficiency
   c. The main objective is to increase precision
   d. The idea is to break the population into heterogeneous groups
   e. All the above are true

4. For stratified sampling, which of the following is NOT true?
   a. A random sample is drawn from each of the strata.
   b. The main objective is to increase precision.
   c. The population is divided into homogeneous groups called strata
   d. The main objective is to reduce cost by increasing sampling efficiency
   e. All the above are true

5. Which of the following is true for the Poisson distribution
   a. The mean equal the variance
   b. The mean equal the standard deviation.
   c. The shape completely depends on the time.
   d. The mean equal to the radical of the standard deviation
   e. The mode always equal to radical of the mean

(Part b) which of the following true and which false?

1. The question "How many times have you abused your spouse in the last 6 months?" will most likely result in nonresponse errors._____

2. The question "Is your household income last year somewhere in between $25,000 and $35,000?" will most likely result in coverage error._____

3. The only way one can eliminate sampling error is to take the whole population as the sample._____

4. Coverage error occurs if a certain groups of items are excluded from this frame so that they have no chance to being selected in the sample._____

5. In order to avoid leading questions, you need to present the questions in a neutral manner._____

For question 8, write your answer in the table below

Multiple choice

1	2	3	4	5

True or False

1	2	3	4	5

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