KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICAL SCIENCES
DHAHRAN, SAUDI ARABIA

STAT 211: BUSINESS STATISTICS I

Mid Term Exam No.2, Semester 041
Time: 7.0 pm- 8.30 pm., Saturday 11/12/, 2004

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Please **circle** your Instructor name

FORM A

Surname: ID# Section

Question No	Full Marks	Marks Obtained
1	5	
2	5	
3	8	
4	10	
5	5	
6	6	
7	6	
8	5	
Total	50	

Q1. (5 Marks) Answer the following questions by indicating it is True or False.

1. A used car lot has 15 cars. Five of these cars were American made and the remainders were made in other countries. If two cars are purchased at random from this car lot, the probability that they are both U.S. cars is .33.

2. The probability that a normal random variable with mean 10 and standard deviation 4, falls above 12 equals the probability that it falls below 8.

3. If the probability of one event occurring is .40 and the probability of a second event occurring is 0.60, then the probability that both events will occur must be 1.0 since that is the maximum value a probability can be.

4. A binomial distribution could very possibly be used to describe the speed in km/hr that cars are traveling on the Dammam-Dhahran highway.

5. The primary difference between the binomial distribution and the Poisson distribution is that the Poisson is used to describe a continuous random variable and the binomial is used for discrete random variables.

Q2. (5 Marks) Answer the following questions by choosing the right answer.

1. When customers dine at the Khobar Café, the managers have noticed that if the total cost of the meal comes to SR40.00 or more, the tip is more likely to be above 15 percent than if the bill is less than SR40.00. The events, bill size, and tip percentage are:
   a. mutually exclusive.
   b. mutually inclusive.
   c. dependent.
   d. independent.

2. Which of the following statements is incorrect?
   a. The expected value of a discrete probability distribution is the long-run average value assuming the experiment will be repeated many times.
   b. The standard deviation of a discrete probability distribution measures the average variation of the random variable from the mean.
   c. The distribution is considered uniform if all the probabilities are not equal.
   d. The mean of the probability distribution is equal to the expected value.

3. hypergeometric probability distribution is used rather than the binomial or the Poisson when:
   a. the sampling is performed with replacement.
   b. the sampling is performed without replacement from an infinite population.
   c. the sampling is performed without replacement from a finite population.
   d. the sampling is performed with replacement from a finite population.

4. Which of the following is not a characteristic of the normal distribution? ?
   a. Symmetric
   b. Mean=median=mode
   c. Bell-shaped
   d. Equal probabilities at all values of x

5. If Z is a standard Normal random variable, then $P(Z < -1.06)$ equals:
   a. 0.4515
   b. 0.4452
   c. 0.3554
   d. 0.1446

Q3. (8 marks) The following table is a partial probability distribution for some company's projected profits (X = profit in SR 1000s) for the first year of operation (the negative value denotes a loss).

x	−100	0	50	100	150	200
P(x)	0.1	0.2	0.3	0.25	0.1	

a. What is the proper value for P(X =200)?
b. What is the probability that the company will be profitable?
c. What is the probability that the company will make at least SR 100,000?
d. What is the expected amount of profit for the company?

Q4 (10 Marks) Small cars constitute 20% of vehicles on the road. The percentage of accidents involving small cars leading to a fatality (death) is 12%, and the percentage of accidents NOT involving small cars leading to a fatality is 5%.

a. What is the probability that an accident will not lead to a fatality?
b. Suppose that a reported accident have led to a fatality, what is the probability that a small car was involved?

Q5 (5 Marks) Historical data shows that the average number of patient arrivals at the intensive care unit of General Hospital is 3 patients every 2 hours. Assume that the patient arrivals are distributed according to Poisson distribution. Determine the probability of 6 patients arriving in a five-hour period.

Q6. (6 Marks) Suppose that we have a sample space $S = \{E_1, E_2, E_3, E_4, E_5, E_6, E_7\}$ with the following probabilities:

$P(E_1) = 0.05$, $P(E_2) = P(E_3) = 0.20$, $P(E_4) = 0.25$

$P(E_5) = 0.15$, $P(E_6) = 0.10$, $P(E_7) = 0.05$

and let $A = \{E_1, E_4, E_6\}$ and $B = \{E_2, E_4, E_7\}$.

a. Find $P(A)$ and $P(A \cap B)$.

b. Find $P(B^c)$ and $P(A \cup B)$.

c. Are the events A and B mutually exclusive? Explain.

Q7 (6 Marks) Weekly demand at a grocery store for a brand of breakfast cereal is normally distributed with a mean of 800 boxes and a standard deviation of 75 boxes

a. What is the probability that weekly demand is between 650 and 950 boxes?
b. The store orders cereal from a distributor weekly. How many boxes should the store order for a week to have only a 5% chance of running short of this brand of cereal during the week?

Q8. (5 Marks)There are 8 flights daily from Riyadh to Dammam. The probability that any flight arrives late is 0.20, and that flight arrivals are independent.

a. What is the probability that at least 2 flights arrive late?
b. How many flights do we expect to arrive late daily?