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

STAT 211: Statistics for Business I
Semester 153
First Major Exam
Wednesday August 17, 2016
7:30 – 9:00 pm

Name: ID #:

Question No	Full Marks	Marks Obtained
1	**24**	
2	**08**	
3	**08**	
4	**08**	
5	**08**	
Total	**56**	

Note: Show all the calculation steps. There are points for steps so if your miss them, you would lose points.

Q.No.1:- Note: The weight of every question in this exam is 3 points.

i. In a Binomial distribution
   a. the variable X is continuous
   b. the probability of event of interest π is stable from trial to trial
   c. the number of trials n must be at least 30
   d. the results of one trial are dependent on the results of the other trials

ii. A stock analyst was provided with a list of 25 stocks out of which the prices of 5 stocks would rise after 30 days. If he randomly selected 3 stocks from the list, he would use what type of probability distribution to compute the probability that all of the chosen stocks would rise after 30 days?
   a. binomial distribution
   b. Poisson distribution
   c. hypergeometric distribution
   d. none of the above

iii. An instructor receives, on average, 24.7 e-mails from students the day before the midterm exam. To compute the probability of receiving at least 10 e-mails on such a day, he will what type of probability distribution?
   a. binomial distribution
   b. Poisson distribution
   c. hypergeometric distribution
   d. none of the above

iv. For a standard normal variable Z, it is known that $P(Z > k) = 0.3745$. The value of k is
   a. 0.99
   b. -1.29
   c. 0.32
   d. 0.16
   e. -0.04

v. Suppose the time interval between two consecutive defective light bulbs from a production line has a uniform distribution over an interval from 0 to 90 minutes. What is the probability that the time interval between two consecutive defective light bulbs will be exactly 10 minutes?
   a. 0
   b. 1
   c. 0.5
   d. 0.25
   e. none of above

vi. In an insurance company, we select an employ randomly. The probability of selection of a male employ is 0.6 whereas the probability of selecting a female employ is 0.4. Further, let X be a random variable such that the value of X is two if male employ is selected and the value of X is one if female employ is selected. What is the expected value of X?

a. 0
b. 0.8
c. 1.7
d. 1.6
e. 2

vii. The interval between consecutive hits at a web site is assumed to follow an exponential distribution with a mean of lambda=0.02 hits per minute. What is the probability that the next hit at the web site will occur within 1 hour?

a. 0
b. 0.4513
c. 0.3012
d. 0.6988
e. 0.5487
f. 1

viii. Let X follows a normal distribution with mean μ and variance $\sigma^2 = 2^2$.
The $P[\mu - 3 < X < \mu + 5]$, rounded up to 3 decimal, is equal to

a. 0
b. 0.041
c. 0.649
d. 0.533
e. 0.927
f. 1

Q.No.2:- (3+2+3 = 8 points) A market research firm conducts telephone surveys with a 40 percent historical response rate. In a random sample of 30 telephone numbers,

(a) What is the exact probability of obtaining 15 responses out of the sample of 30 telephone numbers?

(b) What are the requirements for using a normal distribution to approximate a binomial distribution? Check them.

(c) Using the normal approximation to binomial distribution, approximate the probability of obtaining 15 responses out of the sample of 30 telephone numbers.

Q.No.3:- (2+4+2 = 8 points) You plan to invest $1,000 in a corporate bond fund or in a common stock fund. The following information about the annual return (per $1,000) of each of these investments under different economic conditions is available, along with the probability that each of these economic conditions will occur:

Probability	**Economic Condition**	**Corporate Bond Fund**	**Common Stock Fund**					
0.2	Recession	–70	–300					
0.4	Slow growth	80	100					
0.3	Moderate growth	100	150					
0.1	High growth	120	350					

Compute the

(a) expected return for the corporate bond fund and for the common stock fund.

(b) standard deviation for the corporate bond fund and for the common stock fund.

(c) covariance of the corporate bond fund and the common stock fund.

Q.No.4:- (4+4 = 8 points) For daytime work at a shopping store, employs are paid SR 2,500 per month, plus some overtime. The overtime is normally distributed with mean SR 500 and standard deviation SR 100.

(a) If a random sample of 16 employs is selected, what is the probability that their mean overtime will exceed SR 550?

(b) For a randomly selected employ, what is the probability that his/her overtime money will be between SR 400 to SR 550?

Q.No.5:- (4+4 = 8 points) Studying time other than class room (in minutes) of the students of a specific university are uniformly distributed over interval [0,300].

(a) If we select a student randomly, what is the probability that his studying time will be more than 2 hours?

(b) If a sample of 36 students is selected, what is the probability that their mean studying time is between 160 to 200 minutes?