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

STAT 319: Probability & Statistics for Engineers & Scientists
Term 181, First Major Exam
Monday October 15, 2018 (5:45 pm)

Please circle your instructor's name:

Abbas Anabosi Riaz Saleh

Name:_____ ID#:_____

Section#:_____ Class Time: _____ Serial#:_____

Instructions:

1. Formula sheet will be provided to you in exam. You are not allowed to bring with you, any formula sheet or other printed/written paper.
2. Mobiles are not allowed in exam. If you have your mobile with you, turn it off and keep it under your seat so that it is visible to proctor.
3. Show all your work. **No points for answer without justification**.
4. Round up to 4 decimal points if needed.
5. Make sure you have 6 unique pages of exam paper (including this title page).

Question No	Full Marks	Marks Obtained
1	**08**	
2	**10**	
3	**06**	
4	**08**	
5	**05**	
6	**07**	
Total	**44**	

Q.No.1: - (5+3 = 8 points) A shipment of 20 calculators contains 4 defective sets. A sample of three calculators is selected in succession without replacement from this shipment.

(a) What is the probability that sample will contain at least one defective calculator given the number of defective calculators is not three?

(b) What is the probability that the calculator selected at the second draw is not defective but the third draw is defective?

Q.No.2: - (3+3+4 = 10 points) The pH, a measure of the acidity of water, is important in studies of acid rain. For certain Florida Lake, baseline measurements on acidity are made so any changes caused by acid rain can be noted. The pH of water samples from the lake is a random variable X with cumulative distribution function

$$F(x) = \begin{cases} 0 & x \leq 5 \\ \dfrac{x^2 - 25}{24} & 5 < x < 7 \\ 1 & x \geq 7 \end{cases}$$

(a) Find the probability that the pH of a water sample from this lake will be between 6 and 8.

(b) Find the expected pH of water samples from this lake.

(c) 70% of the water samples have a pH above what value?

Q.No.3: - (3+3 = 6 points) An oil drilling company ventures into various locations, and their success or failure is independent from one location to another. Suppose the probability of a success at any specific location is 0.25.

(a) What is the probability that a driller drills 10 locations and finds one success?

(b) The driller feels that he will go bankrupt if he drills 10 times before the first success occurs. What are the driller's chances for bankruptcy?

Q.No.4: - (5+3 = 8 points)

(a) A certain bank receives, on the average, 2 bad cheques per day. At the start of a specific week, what is the probability that it will receive at least 2 bad cheques on each of next two consecutive days (i.e. at least 2 on Sunday and at least 2 on Monday)?

(b) A software engineer models the crashes encountered when executing a new software as a random variable having the Weibull distribution with $\beta = 0.6$ and $\delta = 20$. What is the probability that the software crashes between 5 and 8 minutes?

Q.No.5: - (3+2 = 5 points) A large firm has 70% of its service calls made by a contractor, and 8% of these calls result in customer complaints. The other service calls are made by their own employees, and these calls have a 5% complaint rate. Find the

(a) probability of receiving a complaint.

(b) probability that the complaint was from a customer serviced by a contractor.

Q.No.6: - (3+4 = 7 points) The probabilities that Ahmad and Mohammad will succeed in assembling the computer are 56% and 71%, respectively, and that the probability that both will succeed is 39%. Compute the probability that

(a) Exactly one of them will succeed in assembling the computer.

(b) Mohammad will not succeed in assembling the computer given that Ahmad has not succeeded in assembling the computer.