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

STAT 319: Probability & Statistics for Engineers & Scientists
Semester 142
First Major Exam
Monday February 23, 2015
6:10 − 7:20 pm

Please circle your instructor name:

Abbas   Al-Sawi   Malik

Riaz   Saleh   Samuh

Name: ID #:   Section #:   Serial #:

Question No	Full Marks	Marks Obtained
1	**06**	
2	**05**	
3	**05**	
4	**08**	
5	**06**	
Total	**30**	

Q.No.1:- (3+3 marks) Samples of a cast aluminum part are classified on the basis of surface finish (excellent or good) and edge finish (excellent or good). Out of 100 parts, 84 parts have excellent surface finish and the rest of 16 have good surface finish. Similarly, 90 parts have excellent edge finish and the rest of 10 have good edge finish. Among 84 parts having excellent surface finish, 80 have excellent edge finish as well.

a) If a part is selected randomly, what is the probability that it will have excellent surface finish or good edge finish?

b) If a randomly selected part has good surface finish, what is the probability that the edge finish is excellent?

Q.No.2:- (5 marks) VOLVO Motor Company manufactures trucks in three plants (say A, B, and C). On average, 4 trucks out of 500 assembled at A are recalled, 10 out 800 assembled at B are recalled, and 10 out of 1000 assembled at C are recalled. If a customer purchases a truck and it is found to be recalled from a dealer (which receives 30%, 40% and 30% of its trucks from plants A, B and C, respectively) what is the probability that the truck came from plant A?

Q.No.3:- (5 marks) If there are 200 typographical errors randomly distributed in a 500-page manuscript, Find the probability that a given page contains exactly 3 errors.

Q.No.4:- (3+2+3 marks) An insurance company offers its policyholders a number of different premium payment options. For a randomly selected policyholder, let X be the number of months between successive payments. The cumulative distribution function of X is:

$$F(x) = \begin{cases} 0, & x < 1 \\ 0.4, & 1 \le x < 2 \\ 0.6, & 2 \le x < 3 \\ 0.8, & 3 \le x < 4 \\ 1, & 4 \le x \end{cases}$$

(a) What is the probability mass function of X?

(b) Compute the mean number of months between successive payments.

(c) Compute $P(1.5 < X < 4)$.

Q.No.5:- (2+2+2 marks) A player of a video game is confronted with a series of opponents and has an 80% probability of defeating each one. Success with any opponent is independent of previous encounters. The player continues to contest opponents until defeated.

(a) What is the probability mass function of the number of opponents contested in a game?

(b) What is the probability that a player defeats at least two opponents in a game?

(c) What is the expected number of opponents contested in a game?

With the Best Wishes