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

STAT213 STATISTICS METHODS FOR ACTUARIES

First Mid Term Exam, Term 121

Instructors: Mohammad F. Saleh

Student Surname: ID#

You are allowed to use electronic calculators and other reasonable writing accessories that help write the exam. Try to define events, formulate the problem and solve it. See the example below.

Example Q:
(3pts) Find the **Area** of a rectangle with perimeter of 30 units and length of 8 units.

Example Answer with grading point scheme.

Perimeter $=2(l + w) = 30 \rightarrow l + w = 15$	(1 pt)
Length $= l = 8 \rightarrow w = 15-l = 7$	(1pt)
$\Rightarrow$ Area $= l*w = 8*7 = 56$ unit^2.	(1 pt)

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	12	
Q2	10	
Q3	30	
Q4	11	
Q5	6	
Q6	6	
Total	75	

Question One (12 points)

Windows is a computer software product made by Microsoft Corporation. In designing windows XP, Microsoft telephoned thousands of users of an earlier version of Windows and asked them how the product could be improved. Assume customers were asked the following questions:

1. Are you the most frequent user of Windows in your household?
2. What is your age?
3. Are the tutorial instructions that accompany Windows helpful?
4. When using a printer with Windows, do you most frequently use a laser printer or another type of printer?
5. How many people in your household have used Windows at least once?

a. Describe the population of interest

b. Describe the sample that was collected.

c. For each variable, indicate if they are categorical or numerical (and if numerical, continuous or discrete).

d. For each variable , indicate the level of measurement

Question Two (10 points)

The 34 students who attended the Statistics course during last summer they achieved the following grades:

C, C, B, C, A, C, C, B, A, D, B, B, A, D, B, B, A, B, C, D, A, D, C, C, F, C, D, C, A, A, A, F, C, A.

a. Construct a frequency distribution for the data.

b. Construct a bar chart for the frequency distribution.

c. Find the suitable measure of central tendency.

d. What are your final conclusions about the grad of the students?

Question Three (30 points)

A traffic inspector has counted the number of automobiles passing a certain point in 30 successive 20-minute time periods. The observations are listed below

23	20	16	18	30	22	26	15	5	18
14	17	11	35	21	6	10	20	22	25
19	19	19	20	12	23	24	17	18	16

1. Check the empirical rule for the given dataset.

2. Do these data contain an outlier? Explain

3. Which is the better measure of center for these data, the mean or the median? Explain.

4. Prepare a frequency distribution. Then approximate the standard deviation.

5. Draw the relative frequency curve. Comment on the shape.

6. Construct The Box plot. Comment on variability of the data set.

Question Four (11 points)

According to a recent market research survey conducted on behalf of a general insurance group, 40% of males over the age 30 own both car and a house, 60% own a house and 70% own a car.

a. What is the probability that a man over age 30, chosen at random, owns a house, or a car, or both?

b. What is the probability that a man over age 30, chosen at random, owns a house and he does not own a car?

c. What is the probability that a man over age 30, chosen at random, owns a house given that he owns a car?

d. Let the two events A: the man owns a house, B: the man owns a car
    a. Are they mutually exclusive? Explain

    b. Are they independent? Explain

Question Five(6 points)

A manufacturer makes two models of an item:
Model I, which accounts for 80% of the unit sales.
Model II, which accounts for 20% of the unit sales.
Because of defects, manufacturer has to replace (or exchange) 10% of its model I and 18% of its model II.

1. If a unit is selected at random, find the probability that it will be defective.

2. Given that the selected unit is defective, what is the probability that the unit from model I?

Question Six(6 points)

The probability that a forward player scores a goal when shooting is 0.4. A football team has three forward players. Find the following probabilities

1. They all score?

2. They all miss?

3. At least one scores?