TECHNICAL UNIVERSITY OF MOMBASA
UNIVERSITY EXAMINATIONS 2018/2019

DEGREE OF DOCTOR OF PHOLOSOPHY IN BUSINESS ADMINISTRATION
BMS 6102: STATISTICS FOR BUSINESS

DATE: AUGUST 2019 _ **DURATION:** 3 HOURS

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER THREE

Question One (25 Marks)

a) Describe the steps involved in the planning and execution of a survey   **(12 Marks)**

b) Outline four (4) advantages of sampling over census method.   **(4 Marks)**

c) Explain four (4) types of measurement   **(9 Marks)**

Question Two (25 Marks)

a. What is the difference between one-way and two-way ANOVA   **(4 marks)**

b. A researcher wishes to try three different techniques to lower the blood pressure of individuals diagnosed with high blood pressure. The subjects are randomly assigned to three groups; the first group takes medication, the second group exercises, and the third group follows a special diet. After four weeks, the reduction in each person's blood pressure is recorded. At $\alpha = 0.05$, test the claim that there is no difference among the means (carry out one-way ANOVA).

Medication	Exercise	Diet
10	6	5
12	8	9
9	3	12
15	0	8
13	2	4
$\overline{X_1} = 1.8$	$\overline{X_2} = 3.8$	$\overline{X_3} = 7.6$
$S_1^2 = 5.7$	$S_2^2 = 10.2$	$S_3^2 = 10.3$

(21 marks)

Question Three (25 Marks)

a. A fertilizer mixing machine is set to give 12 kg of nitrate for every 100kg bag of fertilizer. Ten 100kg bags are examined. The percentages of nitrate are as follows:

11, 14, 13, 12, 13, 12, 13, 14, 11, 12

Is there reason to believe that the machine is defective at $\alpha = 0.05$ level of significance?

Question Four (25 Marks)
a. Discuss the distinctive features of the binomial and multinomial distribution.

(8 marks)

b. What is Poisson distribution

(2 marks)

c. If there are 200 typographical errors randomly distributed in a 500-page manuscript, find the probability that a given page contains exactly three errors

(5 marks)

d. In a music store, a manager found that the probabilities that a person buys zero, one, or two or more CDs are 0.3, 0.6, and 0.1, respectively. If six customers enter the store, find the probability that one won't buy any CDs, three will buy one CD, and two will buy two or more CDs.

(4 marks)

e. Outline six properties of the normal distribution

(6 marks)

Question Five (25 Marks)

a) Differentiate between discrete and continous random variables   **(4 marks)**
b) A random variable X has probability distribution as shown below.

x	-2	-1	0	1	2
P(X=x)	0.3	0.1	0.15	0.4	0.05

Find (i) the expectation, and (ii) the variance   **(5 marks)**
c) On average, 12% of the enrolled in the Federal Aviation Administration's Air Traffic Controller training program will have to repeat the course. If the current class size at the Training Centre is 15, what is the probability that:
(i)   Fewer than 6 will have to repeat the course,
(ii)   Exactly 10 will pass the course,
(iii)   More than 12 will pass the course.

(16 marks)

Question Six (25 Marks)
a. Distinguish between correlation and regression.   **(4 marks)**
b. The following is the age and the corresponding blood pressure of 10 subjects randomly selected subjects from a large city.

Age	38	41	42	45	50	52	55	60	62	65
Blood Pressure	120	115	130	120	132	135	140	145	140	149

a.   Draw the scatter diagram of this data and comment.
b.   Compute the correlation coefficient and compare with part a.
c.   Write the equation of regression and estimate the coefficients.
e.   Estimate the blood pressure of some one who is 40 years of age.

(21 marks)