MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

DOCTOR OF PHILOSOPHY IN FINANCE

BMS 900: STATISTICS FOR BUSINESS I

DATE: **TIME:**

INSTRUCTIONS:

Attempt Question ONE and Any Other Two Questions

QUESTION (COMPULSORY)(30 MARKS)

a) Table 1 shows a frequency distribution of the weekly wages of 65 employees of a company.

Table 1:

Wages ($)	Number of employees
250.00-259.99	8
260.00-269.99	10
270.00-279.99	16
280.00-289.99	14
290.00-299.99	10
300.00-309.99	5
310.00-319.99	2
Total	65

Determine

i) The class mark of the third class

ii) The size of the fifth-class interval

iii) The relative frequency of the third class (6 marks)

b) Table 2 show the frequency distribution of heights (in inch) of 100 males at a university.

Table 2

Height (inch)	Number of students
60-62	5
63-65	18
66-68	42
69-71	27
72-74	8
Total	100

Find

i) the mean height

ii) the median height

iii) the modal class (6 marks)

c) The revenue from an investment by an investor in three ventures is expected to be Ksh 2 m, Ksh 4m and Ksh 6m respectively. Calculate

i) arithmetic mean,

ii) Geometric mean,

iii) Harmonic mean of the revenue

Explain the preferable mean to apply in this case. (8 marks)

d) i) Let the X be a discrete random variable with probability mass function

. $f(x) = c$, for $x = 1,2,3,4$. Determine the value of c.

Hence, or otherwise calculate

ii) $E(X)$

iii) $Var(X)$ (5 marks)

e) Let a random variable X have the Poisson distribution with parameter m.

i) Write down the expression for the probability mass function

ii) Calculate the probability

$P(0 < X < 7)$ (5 marks)

QUESTION TWO (20 MARKS)

a) Suppose a random variable X has a normal distribution for which the mean is 1 and the variance is 4. Find the value of each of the following probabilities:

(i)P($X \leq 3$) (ii) P ($X > 1.5$) (iii) P (X= 1) (iv) P ($2 < X < 5$). (8 marks)

b) Evaluate $\int_0^\infty \exp(-3x^2)\, dx$ (6 marks)

c) i) Define , for a random variable X, its moment generating function M(t).

ii) Show that Var (X) = $M''(0) - [M'(0)]^2$, where M'(0) and M''(0) are the first and the second derivative of M(t) with respect to t , respectively.
(8 marks)

QUESTION THREE (20 MARKS)

a) Consider Table 1 in Question 1. Calculate

i) the mean wage

ii) the variance and

iii) the standard deviation of the wages (6 marks)

b) Assuming that the data in Table 1 is a sample from some population, estimate the 95% confidence interval for the population mean. (4 marks)

c) i) Give the expression for calculating the median for a grouped data.
(4 marks)

ii) Using the formula specified in part (i), calculate the median wage for the data in Table 1. (6 marks)

QUESTION FOUR (20 MARKS)

a) Consider Table 2 in Question 1. Calculate

i) the mean deviation height, MD

Hence, determine the percentage of students' heights that fall within the ranges

ii) Mean ± MD

iii) Mean ± 3 MD (8 marks)

b) i) Define the moment coefficient of skewness. (4 marks)

ii) Calculate the moment coefficient of skewness of the data in Table 2 in Question 1. (8 marks)

QUESTION FIVE (20 MARKS)

a) Let X denote a continuous random variable .

i) Define the distribution function of X, F(x).

Hence

ii) Show that the probability

$P(a < X < b) = F(b) - F(a)$ (8 marks)

b) The profits, in millions of Ksh., from some investment undertaking is random variable. However it is known to lie between zero and Ksh 4 million. Given that the probability density function of X is given by

$f(x) = cx, \quad 0 < X < 4;$

Determine

i) c

ii) $P(1<X<2)$

iii) $P(X > 2)$

iv) Var (X) (12 marks)