MACHAKOS UNIVERSITY

University Examinations 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ARTS (COUNSELLING PSYCHOLOGY)

BACHELOR OF ARTS (GENDER AND DEVELOPMENT)

BACHELOR OF ARTS (PUBLIC ADMNISTRATION)

BACHELOR OF ARTS

ACU 201: INTRODUCTION TO STATISTICS IN SOCIAL SCIENCES

DATE: 14/12/2021   **TIME: 8.30-10.30 AM**

INSTRUCTION:
Answer Question One and Any Other Two Questions

QUESTION ONE (30 MARKS)

a)   Explain the meaning of the following terms as applied in Statistics

    i.   Population

    ii.   Sample

    iii.   Data   (6 marks)

b)   Differentiate between each of the following terms:

    i.   Ordinal and nominal measurement

    ii.   Primary and secondary data

    iii.   Discrete and continuous variable   (6 marks)

c)   The data below relates to the number of successful sales made by a salesmen employed by a large marketing firm in a particular quarter

No of sale	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29
No of salesmen	1	14	23	21	15	6

Calculate the mean and standard deviation   (7 marks)

d)   A college collects the following set of data on the number of credits C that a randomly selected group of students carry and the number of hours H that they work during the week

H	20	25	30	50	20	23
C	12	13	12	15	16	16

Determine the rank correlation coefficient based on these data   (6 marks)

e)   In a random sample of 64 patients in a community health clinic, the mean waiting   time for being served is 3 minutes with a standard deviation of 1.5 minutes. Construct a 99% confidence interval for the average waiting time in the health clinic.   (5 marks)

QUESTION TWO (20 MARKS)

The data below shows the age's 30 students in a statistics class

18   30   30   49   18   27   44   34

19   54   29   21   32   19   51   37

24   20   39   32   18   38   29   33

21   20   19   22   46   21

a)   Tabulate a frequency distribution table with class intervals by 18-25,.. etc   (5 marks)

b)   use the table in (a) above to calculate:

   i.   The mean   (3 marks)

   ii.   The mode   (3 marks)

   iii.   The quartile deviation   (9 marks)

QUESTION THREE (20 MARKS)

a)   Explain the meaning of the following sampling techniques:-

   i.   Simple Random sampling

   ii.   Stratified sampling

   iii.   Quota Sampling

   iv.   Cluster sampling   (8 marks)

b)   A small company is interested in analyzing the effects of advertising on its sales Over a five week period as shown below:

Money spend on advertising	5	8	10	15	22
Total sales	6	15	20	30	39

Use the data to determine correlation coefficient between the money spend on adverting and total sales.   (12 marks)

QUESTION FOUR (20 MARKS)

a)   The following frequency distribution the lower quartile is 44.5.Determine the values of *a*
     and b

Class	Frequency
30-34	7
35-39	12
40-44	a
45-49	b
50-54	38
55-59	15
60-64	8
	$\sum f=200$

(8 marks)

b)   The data below shows gross weekly earnings of employees by age of an IT company in the
     year 2008.

Age (years)	18	20	22	27	35	45	55
Weekly earnings ('000)	15.50	23.20	34.0	44.90	53.10	55.0	57.20

i.   Calculate the least squares regression line of gross weekly earnings on age.

(10 marks)

ii.   Use the equation in (i) to estimate the weekly earnings of an employee aged 50 years

(2 marks)

QUESTION FIVE (20 MARKS)

a)   State and explain the four measurement scales for statistical data as outlined by Stevens
        (1946)

b)   The following table shows the number of children in households in Mombasa County in
     2010.

Number of children in the household   Number of households

        None   25
        1   40
        2   42
        3   28
        4   18
        5   11
        6   9
        7 or more   6
                                               179

i. Calculate the mean and standard deviation of children per households. (7 marks)

ii. Assuming the data is based on a simple random sample from a large population; calculate a 95% confidence interval for the mean number of children in Mombasa county (5 marks)