



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND PHYSICS

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MEDICAL LABORATORY SCIENCES,

AMA2201: BIOSTATISTICS

END OF SEMESTER EXAMINATION

SERIES : DECEMBER 2016

TIME : 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Attempt: QUESTION ONE in section A and any other TWO in section B

Do not write on the question paper.

SECTION A (30MKS)

- a) Define the following terms as used in Biostatistics
- Qualitative data (1mk)
 - Frequency density (1mk)
 - Secondary data (1mk)
- b) A discrete variate takes the value X_i ($i = 1, 2, \dots, k$) with frequencies f_i ($i = 1, 2, \dots, k$) where $\sum f_i = N$, show that $\sum f_i (x_i - \bar{x})^2 = \sum f_i x_i^2 - \frac{(\sum f_i x_i)^2}{N}$, where \bar{X} is the arithmetic mean. (7mks)

- c) Weather records indicate that the probability that a particular day is dry $\frac{3}{10}$. Kaloleni united is a football team, whose record of success is better n dry days than on wet days. The probability that Kaloleni United wins on a dry day is $\frac{3}{8}$, whereas the probability that the team wins on a wet day is $\frac{3}{11}$. Kaloleni united are due to play their next match on a Saturday.
- i. What is the probability that Kaloleni United will win (4mks)
 - ii. Three Saturdays ago Kaloleni United won their match, what is the probability that it was a dry day.

- d) Compute the Harmonic mean of the following data given below (3mks)

Frequency	5	7	13	3	2
Marks	10-20	20-30	30-40	40-50	50-60

- e) Calculate the measure of skewness based on quartile from the following data (6mks)

Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	358	2417	976	129	62	18	10

- f) The heights, X cm, of a sample of 80 female students are summarized by the equation $\Sigma(x-160) = 240$, find the mean height of a single female student (4mks)

SECTION B

2. (20mks)

- a. List any 2 measures of dispersion (2mks)
- b. In a series of 100 individuals, the mean blood glucose in mg/dl was found to be 155 with a standard deviation of 52. In the same individuals the mean serum cholesterol levels in mg/dl was found to be 210 with a standard deviation of 36. Find which character shows greater variation (4mks)
- c. In tossing two coins, what is the probability that a head will occur both on the first coin and on the second coin (2mks)
- d. Calculate the coefficient of correlation and obtain the lines of regression for the following data given below

X	1	2	3	4	5	6	7	8	9
y	8	9	11	10	12	14	13	15	16

Obtain an estimate of y which should correspond on the average to $x=5.50$ (10mks)

- e. Pretty visits her aunt who stays 30km, away, she travels to her aunt's house by bicycle with an average speed of 10km/h, she returns in her friend's car at an average speed of 30km/h, what is her average speed for the round trip? . (2mks)

3. (20mks)

- a. Let $x_i = 1, 2, \dots, n$, be a sample of a given population, show that its standard deviation can also be given by:

$$S = \sqrt{\left(\frac{1}{n} \sum x_i^2 - \bar{x}^2\right)} \quad \text{where } \bar{x} \text{ is the arithmetic mean} \quad (10\text{mks})$$

- b. There are 12 boys and 13 girls, in a class of 25 students, who were given a test. The mean mark for the 12 boys was 31 and the standard deviation of the boys was 6.2. The mean mark for the girls was 36 and the standard deviation of the girls marks was 4.3, Find the mean mark and the standard deviation of the marks of the whole class of 25 students, (6mks)
- c. List any four demerits of the Arithmetic mean (4mks)

4. (20mks)

- a. Give any five characteristics of an ideal measure of dispersion (5mks)
- b. The following results of the height and weight of 1000 students are given as; $\bar{Y} = 170\text{cm}$, $\bar{x} = 60\text{kg}$, $r = 0.6$, $J_y = 6.5\text{cm}$, $J_x = 5\text{kg}$. Anil weighs 45kgs. Sunil is 165cm tall, estimate the height of Anil from his weight and the weight of Sunil from his height. (10mks)
- c. Find the mean of the following data (3mks)

Class	2-4	5-7	8-10	11-13
Frequency	6	8	9	4

- d. List any 2 steps involved in a statistical exercise (2mks)

5. (20mks)

- a) Find the quartiles from the following distributions (7mks)

Age in yrs	Number of patients
15-20	10
20-25	40
25-30	52
30-35	68
35-40	95
40-45	75
45-50	45
50-55	20
55-60	5

- b) Find the standard deviation of the following data (5mks)

Height (cm)	95-105	105-115	115-125	125-135	135-145
No. of Children	20	55	95	70	60

- c) An examination of 8 applicants for a clerical post was taken by a firm, from the marks, obtained by the applicants in accounting and biostatistics, Compute the rank co-efficient of correlation (6mks)

applicant	A	B	C	D	E	F	G	H
marks in parasitology	15	20	28	12	40	60	20	30
marks in biostatistics	40	30	50	30	20	10	30	60

d) List any 2 sources of secondary data

(2mks)

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