MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS
2023/2024 ACADEMIC YEAR
SECOND YEAR FIRST TRIMESTER

SCHOOL OF PURE, APPLIED AND HEALTH SCIENCES
DIPLOMA IN FOODS, NUTRITION AND DIETETICS

COURSE CODE: DND 2107
COURSE TITLE: BIOSTATISTICS

DATE: 15TH DECEMBER, 2023 **TIME: 0830-1030**

INSTRUCTION TO CANDIDATES

Section A: Multiple Choice Questions. Answer ALL Questions
Section B: Short Answer Questions. Answer ALL Questions
Section C: Long Answer Questions. Answer Question ONE and any other ONE question.

This paper consists of 7 printed pages. Please turn over.

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS). SELECT THE CORRECT ANSWER.

1. A manager wants an estimate of sales of salesmen in his company. A random sample 100 out of 500 salesmen is selected and average sales are found to be Shs. 75,000. if a sample standard deviation is Shs. 15000 then find out the population mean at 99% level of confidence.

a) 13420 to 13500
b) 75000 to 78464
c) 34640 to 35400
d) 71536 to 78464

2. Given two samples A and B of 100 and 400 items respectively, they have the means $\overline{X_1}$ = 7 ad $\overline{X_2}$ = 10 and standard deviations of 2 and 3 respectively. Determine the standard error of the samples.

a) 0.25
b) 0.7
c) 1.04
d) 0.5

3.In a sample of 800 candidates, 560 were male. Estimate the population proportion at 95% confidence level.

a) 0.67 to 0.73
b) 0.60 to 0.70
c) 0.54 to 0.64
d) 0.73 to 0.78

4. Chi square test is used to test independence of attributes

a) True
b) False

5.Estimate the standard error of two samples X and Y with mean = 7 and 10 respectively with standard deviations of 2 and 3 respectively. Determine the standard error of the samples.

i. 0.5
ii. 0.25
iii. 1.04
iv. 0.76

6.In a study carried out at Narok county referral hospital where out of a sample of 800 patients, 560 were report to be female . at 95% level of confidence estimate the confidence levels within which the population proportion lies.

i. 0.54 to 0.64
ii. 0.67 to 0.73
iii. 0.60 to 0.70
iv. 0.73 to 0.78

7.What statistical measure will you use to test the independence of statistical attributes

c) Regression analysis
d) Students ***t*** test
e) F test
f) Chi square test

8.What is the standard error value of two tailed test at a 1% level of significance

a) 1.96
b) 1.65
c) 2.33
d) 2.50

9. The statistic that provides a measure of the strength of association between two variables ; dependent variable and the independent is called …….

a) Coefficient of correlation
b) Analysis of variance
c) Students *T* test
d) Standard error

10. The following are estimations for testing hypothesis , which one is not .

a) Z score /Normal test
b) t test
c) Chi squared test
d) Coefficient of variation

11. In a symmetrical bell shaped distribution, approximately 95% of the distribution will lie between ±2

a) True
b) False

12. The following regression line y = 5 +0.785x, shows the relationship between two variables ,estimate the value of y when x is 100.

a) 83.5
b) 78.5
c) 500
d) 5.785

13. A researcher noticed that the relationship between the mean weight of children and the height was represented by a regression line y = 3.4 +0.785x, where x is the height. Estimate the value of y when x is 10.

a) 11.25
b) 8.5
c) 19.0
d) 4.485

14. Which of the following explain a value of a distribution with the highest frequency

a) Mean
b) Standard deviation
c) Mode
d) Median

15. Non Parametric tests assumes that the data under consideration fulfill normality condition and so standard statistical tests can be used.

a) True
b) False

16. One way Analysis of Variance (ANOVA) is a test used for Comparing more than 2 two population means with known population variance .

a) True
b) False

17. The Coefficient of Correlation is a measure of the strength of the relationship between two variables.

a) True
b) False

18. A Dependent Variable is a variable that is being predicted or estimated.

a) True
b)False

19 A variable that is being predicted or estimated is referred to as ……..

a) Dependent variable
b)Intervening variable
C)Independent variable
D) None of the above

20. The values which separate the rejection region from the acceptance region are called critical values

a) True
b) False

SECTION B: SHORT ANSWER QUESTIONS (40 MARKS). ANSWER ALL QUESTIONS.

1. A sample of 8 students were given a diagnostic test before studying a particular module and then again after completing the module. The following data gives their scores before and after the training.

Score 1	Before	19	21	17	21	23	18	14
Score 2	After	25	30	23	24	16	29	19

Test at 0.05 levels of significant if the learning process leads to improvements in students performance . **(10 Marks)**

2)Brandways company indicate on the label that their loaves of bread weigh 400g. A sample of 40 loaves was selected hourly from their processing line and the contents weighed. Last hour a sample of 40 loaves had a mean weight of 403g with a standard deviation of 8g. Test at .05 significance level whether their process is out of control? **(10 marks)**

2. The following table gives three treatments made to some groups

Treatment 1	X1	15	20	19
Treatment 2	X2	10	15	11
Treatment 3	X3	18	19	23

Test at α = 5% whether the Treatments have different effects or are the same . **(10 marks)**

b)The daily water usage per person in Narok is normally distributed with a mean of 30 gallons and a standard deviation of 5 gallons. What is the probability that a person from the town selected at random will use;

(a) less than 30 gallons per day?

(b) less than 35 gallons per day?

(c) more than 30 gallons per day?

(d) Uses between 30 and 35 gallons? **(10 marks)**

SECTION C: LONG ANSWER QUESTIONS (40 MARKS).QUESTION ONE IS COMPULSORY, THEN CHOOSE EITHER QUESTION 2 OR 3.

1. a.) Narok referral hospital is in the process of testing the effectiveness of a drug to cure a rare disease in the county . A sample of 300 people were selected of these 150 were given a drug and the others were not given any drug. The results are as follows.

	Drug	**No drug**
Cured	105	85
Not cured	45	65
Total	150	150

Test whether the drug will be effective or not, at 1% level of significance.

(10 marks)

1.b)The following data the standard hours used in a factory and the expected output . two factories are selected and the data given as follows.

Factory 1	42	50	43	39	41	49	52	41	46	48
Factory 2	39	45	36	42	52	37	43	41	40	39

Given that the following statistics from the factory ; mean =45.1 and variance = 20.1 for factory 1 while for factory 2 the mean is 41.4 and the variance is 21.2.

Test the hypothesis that the mean standard hours for employees in the two factories is the same. **(10 marks)**

2 a) In Kisii county the medics are testing two Drugs, to assess their effectiveness in treating a disease. The results obtained were given as shown in the table below

Contestants	**A**	**B**	**C**	**D**	**E**	**F**	**G**
DRUG 1	8	12	16	9	3	3	2

DRUG B	10	8	12	15	6	8	11

REQUIRED

Your are required to test whether the 2 drugs differ significantly in regard to their effect in treating the disease at 5% level of significance. Consider t = 2.23

(10 Marks)

2.b.A medical survey was conducted in order to establish the proportion of the population which was infected with cancer. The results indicated that 30% of the population were suffering from the disease. A sample of 25 people was later taken and examined for the disease. Find the probability that the following outcomes were observed .

a) Only one person had the disease
b) Exactly two people had the disease
c) At most two people had the disease **(10 marks)**

3.a. In Makueni county , it has been established that the probability of the population suffering from a rare medical condition is 2%. A sample of 100000 children was examined. Find the expected number suffering from the disease and hence determine the variance and the standard deviation for the above problem.

(10 marks)

3b .From the data given compute the following .

Retirement benefits £ '000	No of retirees (f)
20 – 29	50
30 – 39	69
40 – 49	70
50 – 59	90
60 – 69	52
70 – 79	40
80 – 89	11

i. Mean
ii. mode
iii. median
iv. Standard deviation and
v. Coefficient of variation **(10 marks)**

/END/