

2428/204
STATISTICS
June/ July 2021
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN SOCIAL WORK AND COMMUNITY DEVELOPMENT

MODULE II

STATISTICS

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

mathematical tables;

scientific calculator.

Answer any FIVE of the following EIGHT questions in the answer booklet provided.

All questions carry equal marks.

Maximum marks for each part of a question are as shown.

Candidates should answer the questions in English.

This paper consists of 6 printed pages

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

1. (a) (i) Explain the meaning of 'observation' as applied in data collection and presentation. (2 marks)

(ii) Highlight **three** disadvantages of observation as a technique for data collection in research. (6 marks)

(b) The covid-19 taskforce is currently considering the results to be expected on launching public education. As part of this review, the taskforce estimated the probabilities that other organizations will join in their own way to educate the public on covid-19. The task force has estimated that the probability that organization A will join in public education is 0.4, that organization B joins is 0.7, and that organization C joins the public education is 0.2.

A 0.4 B 0.7 C 0.2

Required:

Calculate the probability that:

(i) non of the three organizations will join the public education. (3 marks)

(ii) organization A and B will join the public education but C will not. (3 marks)

(iii) there will be exactly one of the three organizations joining the public education. (3 marks)

(c) What is the probability of getting a 3 or a 6 with a throw of a die? (3 marks)

2. (a) (i) Explain the meaning of 'Bias' as used in sampling theory. (2 marks)

(ii) Highlight **four** sources of bias in sampling. (8 marks)

(b) In a sample of 800 candidates, 560 were male. Estimate the population proportion at 95% confidence level. (10 marks)

3. (a) The following information was obtained from a Swiss Bank which was giving loans to some youth groups in 2015.

Loan	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Youth group	15	17	19	27	19	12

For the above distribution, calculate:

- (i) mean;
- (ii) mode;
- (iii) standard deviation;
- (iv) coefficient of skewness. (14 marks)

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- (b) Highlight **three** advantages of standard deviation as a measure of dispersion. (6 marks)

4. (a) The following data was obtained by a sociologist while investigating the relationship between the number of unauthorized days that an employee is absent per year and the distance, in kilometers, between home and work place for the employee. A sample of 10 employees was taken.

Distance to work in (km)	15	24	25	30	35	40	45	65	70	75
Number of days absent	60	45	50	35	42	46	28	20	22	15

- (i) Calculate the product moment correlation coefficient. (10 marks)
- (ii) Comment on the correlation coefficient in (i) above. (2 marks)

- (b) Explain **four** advantages of diagrammatic presentation of data. (8 marks)

5. (a) Explain the meaning of each of the following terms as used in network analysis:

- (i) Critical path; (2 marks)
- (ii) Dangling activity; (2 marks)
- (iii) Float; (2 marks)
- (iv) Dummy activity. (2 marks)

- (b) The following activities and corresponding time in days, relate to a community development project.

<u>Activity</u>	<u>Preceding activity</u>	<u>Time in days</u>
A	-	3
B	-	1
C	-	2
D	A	4
E	A and B	3
F	C	1
G	F	5
H	D and E	2
I	G and H	4

- (i) Draw a network diagram for the project.
- (ii) State the:
- (I) critical path;
- (II) expected time to complete the project.

(12 marks)

6. (a) Highlight **four** advantages of payback period method of longterm investments appraisal. (8 marks)
- (b) The following data relates to a given stock item of a firm.

Normal usage	1,300 units per day
Minimum usage	900 units per day
Maximum usage	2,000 units per day
Lead - time	15 - 20 days
EOQ	30,000 units

Using the above information, calculate the following control levels:

- (i) Reorder level;
(ii) Minimum level;
(iii) Maximum level. (12 marks)

7. (a) Explain **four** fields in which time series analysis is applicable. (8 marks)
- (b) (i) Enumerate **two** merits of the use of Harmonic Mean as a measure of central tendency. (2 marks)
- (ii) Explain the circumstances when the Harmonic Mean is appropriate in the calculation of average. (2 marks)
- (iii) A social worker in a referral hospital wanted to know the daily average number of patients who visit the hospital due to accidents caused by *boda boda* riders. She collected the following data in one week.

Day of the week	Number of patients
Monday	15
Tuesday	10
Wednesday	20
Thursday	28
Friday	15
Saturday	25
Sunday	20

Using assumed mean of 15, calculate the daily average number of patients. (8 marks)

8. (a) State and explain **four** limitations of the use of statistics in business. (8 marks)
- (b) A comparison of the wearing out of the quality of two types of tyres was obtained by road testing. Samples of 100 tyres were collected for each type of the tyres. The miles traveled until wear out were recorded and the results given were as follows.

Mean $\bar{x}_1 = 26,400$ miles, $\bar{x}_2 = 25,000$ miles

Variance $S_1^2 = 1,440,000$ miles $S_2^2 = 1,960,000$ miles

Establish the 95% confidence interval for the estimate of the population mean.

(12 marks)

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