2428/204
STATISTICS
June/July 2020
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:
Answer booklet;
Mathematical tables/calculator.
*This paper consists of **EIGHT** questions.*
*Answer any **FIVE** questions in the answer booklet provided.*
All questions carry equal marks.
Candidates should answer the questions in English.

This paper consists of 8 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) Explain **five** rules followed when drawing network diagrams. (10 marks)

(b) The number of defective items in a production line is normally distributed with a mean of 50 and a standard deviation of 5.

Determine the probability that the number of defective items in the production line will be:

(i) greater than 45 units;
(ii) between 40 and 60 units;
(iii) greater than 65 units;
(iv) below 40 units.

(10 marks)

2. (a) Explain **four** functions of statistics in social work. (8 marks)

(b) A community based organization intends to invest in either project A or project B.
The initial investment for either project is Ksh 800,000.
The expected cash inflows from each project is as shown below.

Year	Cash Inflows (Ksh)	
	Project A Ksh	Project B Ksh
1	200,000	100,000
2	400,000	200,000
3	400,000	400,000
4	500,000	600,000

The cost of capital is 14%.

(i) For each project, determine the:

(I) payback period;
(II) profitability index.

(ii) Based on the results in (i)(II) above, advise the management on the project to invest in.

(12 marks)

3. (a) Differentiate between each of the following pairs of terms as used in sampling theory:

(i) Sample and census;
(ii) Probability sampling and non-probability sampling.

(8 marks)

(b) The following data shows the number of tourist bookings for a week in two hotels, Hotel Pekat and Hotel Tawa:

Day of the week	Hotel Pekat	Hotel Tawa
Monday	986	125
Tuesday	990	137
Wednesday	985	115
Thursday	960	148
Friday	970	200
Saturday	950	136
Sunday	928	119

(i) For each hotel, determine the:

(I) mean weekly number of tourist bookings;
(II) standard deviation;
(III) coefficient of variation.

(ii) Based on the results in (i)(III) above, compare the performance of the two hotels. (12 marks)

4. (a) The following data relates to monthly salaries paid to employees in an organization.

Monthly salary Ksh '000'	Number of employees
14 - 16	1
16 - 18	5
18 - 20	10
20 - 22	35
22 - 24	55
24 - 26	74
26 - 30	20

Determine the:

(i) arithmetic mean salary;

(ii) median salary.

(8 marks)

(b) The following table shows the rankings done by two managers on the performance of ten workers:

Worker	Rank by manager 1	Rank by manager 2
A	2	3
B	1	2
C	3	1
D	4	4
E	6	6
F	5	7
G	8	5
H	7	9
I	10	10
J	9	8

(i) Calculate the Spearman's rank correlation coefficient.

(ii) Interpret the result obtained in (i) above.

(12 marks)

5. (a) Explain **four** benefits of time series analysis. (8 marks)

(b) The following are the scores of 50 students in a Sociology examination:

15	45	40	42	50	60	62	68	70	42
75	75	80	81	25	26	31	32	78	45
30	45	42	43	55	56	78	80	81	62
60	62	58	69	70	45	50	56	72	58
75	62	60	65	60	70	35	37	40	55

Prepare a frequency distribution table, using the exclusive method, starting from 10 - 20, 20 - 30, ...

(12 marks)

6. (a) Explain **five** disadvantages of excessive stock levels in an organization. (10 marks)

(b) The manager of a beverage company claims that the average content in their bottles is 0.5 litres. A random sample of 100 bottles is selected and the mean content found to be 0.45 litres, with a standard deviation of 0.10 litres.

Test the manager's claim at 5% level of significance. (10 marks)

7. (a) The following information relates to activities of a project.

Activity	Preceeding activity	Duration (days)
A	-	5
B	-	7
C	-	8
D	A	4
E	B	12
F	C	5
G	D, E	8
H	F	4
I	G, H	5

(i) Draw a network diagram for the project;

(ii) Determine the:

(I) critical path;

(II) expected project duration.

(10 marks)

(b) The following are the monthly expenditure in an organization during the year 2017.

Month	Expenditure (Ksh '000')
January	10
February	12
March	8
April	12
May	14
June	16
July	12
August	10
September	12
October	10
November	8
December	18

Using the data above, compute the three monthly moving averages.

(10 marks)

8. (a) John, a retiree, was paid a lumpsum amount of Ksh 1,800,000 as pension. He intends to invest the amount for a duration of 5 years using one of the following options:

Option A:

Invest the amount in an account that pays compound interest at the rate of 12% per annum, compounded annually, for five years.

Option B:

Invest the amount in an account that pays interest at the rate of 10% per annum, compounded semi-annually for five years.

Option C:

Invest the amount in an account that pays interest at the rate of 12% per annum, compounded quarterly for five years.

(i) For each of the options, calculate the total amount that will be in his account at the end of the 5 years.

(ii) Advise John on the option to choose to invest his money.

(10 marks)

(b) The following information concerns the advertising costs and the resultant sales in a firm:

Advertisement cost (Ksh '000') (x)	Sales (Ksh '000') (y)
5	50
8	70
10	100
12	100
14	120

(i) Determine the regression equation of: y on x.

(ii) Using the equation in (i) above, estimate the amount of sales when the advertisement cost is Ksh 20,000.

(10 marks)