

2428/204
STATISTICS
Oct./Nov. 2022
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 a total of FIVE questions.

All questions carry equal marks.

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.

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Turn over

1. (a) Explain five functions of statistics. (10 marks)
- (b) The following data relates to the infant survival and female adult literacy in nine counties around Kenya.

County	A	B	C	D	E	F	G	H	I
Female adult literacy rate (%)	9	8	7	6	5	4	3	2	1
Infant survival rate (per '000')	15	16	14	13	11	12	10	8	9

- (i) Calculate coefficient of correlation between female adult literacy and infant survival. Take: $r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{n\sum x^2 - (\sum x)^2} \sqrt{n\sum y^2 - (\sum y)^2}}$
- (ii) Interpret the result obtained in (i) above. (10 marks)
2. (a) The following are the daily wages, in Kenya shillings, of workers in a children's home.
- 140 139 126 114 100 88 62 77 99 142
 129 144 148 134 63 69 148 132 118 108
 123 105 95 80 85 106 123 133 103 116

- (i) Prepare a frequency distribution table, starting with 60-75, using the exclusive method. (8 marks)
- (ii) Calculate the mean daily wage. (2 marks)
- (b) The following table shows the marks scored by students in a Statistic test.

Marks (%)	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	7	12	18	25	16	14	8

Calculate:

- (i) median;
- (ii) co-efficient of mean deviation. (10 marks)
3. (a) Explain five advantages of sampling in data collection. (10 marks)
- (b) Out of 300 students in a girl's school, 95 play cricket only, 120 play football only, 80 play volleyball only and 5 play no game. If one student is chosen at random; determine the probability that:
- (i) she plays volleyball; (3 marks)
- (ii) she plays either cricket or volleyball. (3 marks)
- (iii) she plays neither football nor volleyball. (4 marks)

4. (a) (i) Highlight **two** characteristics of a good estimator. (4 marks)
- (ii) A sample of 600 accounts was taken to test the accuracy of posting and balancing of accounts, 45 mistakes were found. Using 99% confidence level, calculate the population proportion. (6 marks)

- (b) Kolo Children Home uses 10,000 units of product X10 in a year. Annual carrying costs are Ksh 5 per unit per year, while the ordering costs are Ksh 250 per order. Determine the:
- (i) Economic Order Quantity (EOQ);
- (ii) number of orders in a year;
- (iii) total relevant cost. (10 marks)

5. (a) Explain each of the following terms as used in sampling:

- (i) Quota sampling; (2 marks)
- (ii) Snowball sampling; (2 marks)
- (iii) Random sampling; (2 marks)
- (iv) Stratified sampling. (2 marks)

- (b) The following table shows the number of elderly persons admitted in Njema Home.

Year	1	2	3	4	5	6	7	8	9	10
No of elderly person	100	111	123	125	129	139	152	159	165	171

Using the equation: $y = a + bx$, estimate the number of elderly persons to be admitted in year 11. (12 marks)

6. (a) Explain each of the following terms as used in hypothesis testing:

- (i) Null hypothesis; (2 marks)
- (ii) Alternate hypothesis; (2 marks)
- (iii) Type I error; (2 marks)
- (iv) Type II error. (2 marks)

- (b) Pata Homes intends to undertake a project with the following activities and project duration:

Activities	Preceding activity	Duration (weeks)
A	—	7
B	—	7
C	—	7
D	A	3
E	B	2
F	C	3
G	C	3
I	G	5
J	E,F	4
K	D, I, J	6

- (i) Draw a network to represent the information above. (12 marks)
- (ii) Determine the critical path and project duration. (8 marks)
7. (a) Explain **four** advantages of Pay Back period method of investment appraisal. (8 marks)
- (b) The wages of workers in Upendo Child Care organisation is as follows.

Wages (Ksh/day)	Less than 35	35-37	38-40	41-43	Over 43
Number of workers	14	62	99	18	7

Using the above data, calculate:

- (i) quartile deviation; (12 marks)
- (ii) co-efficient of quartile deviation.

8. (a) Explain **four** components of time series. (8 marks)
- (b) Mama Oda Children's Home intends to invest Ksh 10,000,000 in either project A or project B. The following are the expected net cash inflows from the projects.

Year	Project	Project
	A	B
	Ksh	Ksh
1	4,500,000	3,000,000
2	3,000,000	2,000,000
3	1,000,000	2,000,000
4	2,500,000	4,000,000
5	500,000	4,000,000

The cost of capital is 10%.

- (i) Determine the net present value for each project.
- (ii) Advise the management on the project to invest in, using the values obtained in (i) above. (12 marks)

Table A Present Value of Sh 1 Received at the End of n Periods:
 $PVIF_{r,n} = 1/(1+r)^n = (1+r)^{-n}$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8860	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8705	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1769	.1388	.1065	.0854
9	.9143	.8368	.7664	.7026	.6445	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0620
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0194
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0706	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4554	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6085	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0686	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001	.	.
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001

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