

2405/304  
APPLIED STATISTICS  
Oct./Nov. 2017  
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN APPLIED STATISTICS

APPLIED STATISTICS

3 hours

**INSTRUCTIONS TO CANDIDATES**



**This paper consists of 5 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 the following terms as used in quality control:

- (i) acceptance sampling;
- (ii) lot tolerance;
- (iii) producer's risk.

(6 marks)

(b) Samples of 120 tubes are drawn randomly from the output of a process that produces thousand of units daily. Sample items are inspected for quality and defective items are rejected. The results of 12 samples are shown in Table 1.

Table 1

Sample Number	Number of defective tubes	Sample Number	Number of defective tubes
1	8	7	14
2	10	8	6
3	13	9	10
4	9	10	13
5	8	1	18
6	10	12	15

(i) Construct the percentage fractional defective chart.

(ii) Comment on the production process.

(14 marks)

2. (a) Explain four demerits of price index numbers.

(8 marks)

(b) Table 2 shows the prices and quantities of some commodities for the years 2012 and 2013.

Table 2

Commodity	2012		2013	
	Quantity (Kgs)	Price (Kshs)	Quantity (Kgs)	Price (Kshs)
A	16	180	18	200
B	18	200	20	240
C	20	120	16	260
D	12	100	14	140
E	10	80	12	100
F	14	60	15	80

Calculate the:

- (i) Laspeyre's Quantity Index;
- (ii) Paasche's Quantity Index;
- (iii) Marshall Edgeworth's Quantity Index.

(12 marks)



3. (a) Explain **four** uses of time series analysis. (8 marks)
- (b) Table 3 shows the production of a commodity in tonnes by a company from the years 2004 to 2010.

Table 3

Year	2004	2005	2006	2007	2008	2009	2010
Production (tonnes)	32	44	56	60	68	76	84

- (i) Calculate the regression equation of the line in the form  $Y = a + bz$ .
- (ii) Forecast on the production volume in the year 2014. (12 marks)

4. (a) Explain **four** limitations of free international trade to a country. (8 marks)
- (b) Table 4 shows the salary of employees in thousands of shillings for company XYZ Limited.

Table 4

Salary	Number of Employees
30 - 39	4
40 - 49	8
50 - 59	6
60 - 69	12
70 - 79	7
80 - 89	5
90 - 99	3
100 - 109	1

- (i) Draw the cumulative frequency curve.
- (ii) Determine the number of employees who earn:
- I. between Kshs. 52,000 and Ksh. 86,000;
  - II. Kshs. 85,000 and above. (12 marks)



5. (a) Outline **five** disadvantages of a decentralised statistical system. (5 marks)
- (b) Table 5 shows the marks obtained by some students in accounts and statistics tests.

Table 5

Marks	Number of students	
	Accounts	Statistics
0 - 9	6	10
10 - 19	4	8
20 - 29	12	16
30 - 39	15	22
40 - 49	10	18
50 - 59	8	14
60 - 69	3	7
70 - 79	2	4

Determine the:

- (i) arithmetic mean;
- (ii) coefficient of variation. (15 marks)
6. (a) Explain **five** types of data classification. (10 marks)
- (b) (i) Explain the **three** approaches used in computing national income of a county.
- (ii) Outline **four** limitations of national income statistics. (10 marks)
7. (a) With reference to statistical quality control, outline **four** distinctions between sampling and 100% inspection. (8 marks)
- (b) The measurement of the diameters of a random sample of 180 nuts made by a drilling machine during a certain period showed a mean of 0.622 cm and a standard deviation of 0.032 cm. Determine the 95% confidence limits for the mean diameters. (4 marks)
- (c) Explain **four** causes of inequality in the distribution of income amongst individuals. (8 marks)
8. (a) Explain the following terms as applied in statistics:
- (i) statistical inference;
- (ii) statistical estimation;
- (iii) testing of hypothesis. (6 marks)

- (b) Table 6 shows the production of a commodity by Alpha Limited in thousands of tonnes for the years 2001 and 2002.

**Table 6**

Months	January	February	March	April	May	June	July
2001	95	93	80	75	50	52	60
2002	96	95	80	72	48	55	65

- (i) Construct the Z - chart.
- (ii) Comment on the chart drawn in b(i). (14 marks)

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