

Name \_\_\_\_\_ Index No. \_\_\_\_\_

2902/204      2908/204

Candidate's Signature \_\_\_\_\_

2909/204      2920/204

**QUANTITATIVE METHODS**

Date \_\_\_\_\_

July 2015

Time: 3 hours

**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**DIPLOMA IN SALES AND MARKETING  
DIPLOMA IN HUMAN RESOURCE MANAGEMENT  
DIPLOMA IN ROAD TRANSPORT MANAGEMENT  
DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY**

**QUANTITATIVE METHODS****3 hours****INSTRUCTIONS TO CANDIDATES***Write your name and index number in the spaces provided above.**Sign and write the date of the examination in the spaces provided above.**This paper consists of **TWO** sections: **A** and **B**.**Answer **ALL** the questions in section **A** and any **FOUR** questions from section **B** in the spaces provided in this question paper.**Show all your working.**Candidates should answer the questions in English.***For Examiner's Use Only**

Section	Question	Maximum Score	Candidate's Score
<b>A</b>		<b>32</b>	
<b>B</b>		<b>17</b>	
		<b>17</b>	
		<b>17</b>	
		<b>17</b>	
<b>TOTAL SCORE</b>			

**This paper consists of 20 printed pages.****Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

**SECTION A (32 marks)**

Answer **ALL** the questions in this section in the spaces provided after each question.

1. State **four** qualities of a good questionnaire. (4 marks)

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2. A shop stocks two types of jembes, type I and type II. Twelve type I jembes and five type II jembes cost Ksh. 1,260, while nine type I jembes and fifteen type II jembes cost Ksh. 1,620. A farmer bought ten type II jembes. Determine the amount that he paid for them. (4 marks)

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3. The total revenue of a firm is given by the function:

$$TR = 10Q^2 - 200Q$$

Determine the level of output ( $Q$ ) that will maximize total revenue. (3 marks)

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4. Outline **four** advantages of using tables in the presentation of data. (4 marks)

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5. Determine the interquartile range for the following set of numbers:

8, 18, 10, 8, 14, 12, 4, 2, 12, 14 16. (3 marks)

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6. Highlight **four** properties of a good measure of central tendency. (4 marks)

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7. The following data relates to a project, A.

	Returns (Ksh. 000's)	Probability
Outcome I	6,000	0.2
Outcome II	7,000	0.5
Outcome III	5,000	0.3

Determine the expected returns of the project. (3 marks)

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8. Explain the meaning of each of the following terms as used in network analysis:

- (i) Dangling activity;
- (ii) Loop;
- (iii) Event.

(3 marks)

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9. The profits of company X for a period of five years are given as follows:

Year	Profits (Ksh. millions)
2000	10
2001	15
2002	12
2003	8

Using the chain base index method, construct the indices to show changes in profits for each year. (2 marks)

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10. Distinguish between 'trend' and 'seasonal' variations in a time series. (2 marks)

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**SECTION B (68 marks)**

*Answer any **FOUR** questions from this section in the spaces provided in this question paper.*

11. (a) Ms. Jones saved Ksh. 20,000 during the first year of employment. In each subsequent year, she saved 15% more than the preceding year, until she retired. Determine the:
- (i) amount saved in the third year;
  - (ii) number of years it would take her to save a sum of Ksh. 580,000;
  - (iii) total amount she had saved after 20 years of service.
- (9 marks)
- (b) Explain **four** limitations of relying on secondary data in business decision making.
- (8 marks)

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12. (a) The following information was extracted from the records of a company showing the expenses that were incurred in running the production plant for the last 10 years.

Age of plant (years)	Expenses (Ksh. 000's)
1	5
2	4
3	10
4	12
5	15
6	15
7	20
8	12
9	25
10	30

- (i) Calculate the Pearson's Product Moment Co-efficient of Correlation;  
 (ii) Interpret the result in (i) above.

(9 marks)

- (b) A company has tendered for two contracts, A and B. The probability of winning contract A is  $\frac{2}{3}$  and that of winning contract B is  $\frac{3}{5}$ .  
 Determine the probability of winning:

- (i) no contract;  
 (ii) at least one contract;  
 (iii) contract A or B;  
 (iv) contract A and B.

(8 marks)

13. (a) The prices and quantities of three commodities in a country for the years 2005 and 2010 are given in the table below:

Commodities	2005		2010	
	Price (Ksh.)	Quantity	Price (Ksh)	Quantity
Sugar (Kg)	90	200	120	150
Milk (Ltr)	40	150	60	100
Tomatoes (kg)	20	100	50	80

Calculate:

- (i) Laspyre's price index;
- (ii) Paasche's price index;
- (iii) Fisher's ideal price index.

(9 marks)

- (b) Explain **four** limitations of using diagrams in presentation of data.

(8 marks)

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14. (a) Explain **four** probabilistic techniques of sampling. (8 marks)

(b) The profits of a company for a period of eight years is given in the table below:

Year	Profits (Ksh. 000's)
2002	80
2003	100
2004	90
2005	125
2006	140
2007	120
2008	130
2009	150

(i) Determine the trend line equation using the method of least squares;

(ii) Using the equation in (i) above, predict the profit for the year 2010.

(9 marks)

15. (a) A company intends to introduce either of the three products; X, Y or Z, into the market. An analysis of the probable acceptance of the three products is shown in the table below:

Level of acceptance	Probability	Profits (Ksh. 000's)		
		X	Y	Z
Good	0.3	200	300	250
Moderate	0.5	120	200	150
Poor	0.2	-50	-30	0

Using the Expected Value Criteria, advise the firm on which product to introduce into the market.

(10 marks)

- (b) At the beginning of every year, an investor deposited Ksh. 100,000 in a bank which paid compound interest at the rate of 20% per annum. He stopped further deposits after four years. The money remained in the account for a further five years.

Determine the amount of:

- (i) money he had at the end of the first four years;  
(ii) interest that the money generated in the entire period.

(7 marks)

16. (a) The marginal revenue function of a firm is given as:  $MR = 200 + 10q$ , while the average cost function is given as:  $AC = 100 + 6q$ , where  $q$  = quantity of output.

Determine the:

- (i) profit function;
- (ii) level of output that will maximize profit;
- (iii) maximum profit.

(8 marks)

- (b) The following table shows the distribution of profits among the branches of two companies, A and B.

Profits (Ksh. 000's)	Number of Branches	
	Company A	Company B
0-20	20	5
20-40	30	10
40-60	10	40
60-80	15	15
80-100	20	30
100-120	5	10

Determine the coefficient of variation for each company.

(9 marks)