KASNEB

CIFA PART I SECTION 1

FINANCIAL MATHEMATICS

PILOT PAPER

September 2015. **Time Allowed: 3 hours.**

Answer ALL questions. Marks allocated to each question are shown at the end of the question.

QUESTION ONE

(a) Explain four determinants of working capital of a business organisation. (8 marks)

(b) The Ministry of Economic Development in a country has provided the following data to estimate the cost of living of several households over a two month period:

	Quantity (Kg.)		Purchases (Sh.)	
Commodity	**July**	**August**	**July**	**August**
Rice	400	500	12000	16000
Sugar	20	15	2200	1500
Maize	80	100	2000	2800
Beans	90	90	3600	3780

Required:

(i) Laspeyre's quantity index. (4 marks)

(ii) Paasche's quantity index. (4 marks)

(iii) Fisher's ideal index. (4 marks)

(Total: 20 marks)

QUESTION TWO

(a) Explain four limitations of index numbers. (8 marks)

(b) The following is the distribution of salaries of 62 employees in a financial institution:

Salary (Sh. '000')	**Number of employees**
Less than 20	3
20 - 29	5
30 - 39	8
40 - 49	8
50 - 59	12
60 - 69	9
70 - 79	7
80 - 89	4
90 - 99	4
Above 99	2

Required:

(i) Modal salary. (3 marks)

(ii) Quartile deviation. (3 marks)

(iii) Median salary. (3 marks)

(iv) Percentile seventy (P_{70}) (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) Maxmin Enterprises has Sh.23,000,000 to invest in either project X or project Y.

The following are the expected cash inflows from each project for four years:

Year	Cash inflows (Sh. '000') Project X	Project Y
1	4000	10000
2	8000	9000
3	12000	6000
4	5000	4000

The cost of capital is 10% per annum.

Required:

(i) Net present value (NPV) for each project. (10 marks)

(ii) Advise the management on the project to invest in. (2 marks)

(b) The data below shows the net profit (loss) and share prices of a sugar producing company in Country X over a five year period.

Year	Net profit (loss) Sh.	Share price Sh.
2010	(2,000,000)	3
2011	980,000	5
2012	1,200,000	8
2013	(500,000)	4
2014	(150,000)	2

Required:

(i) Karl Pearson's coefficient of correlation (r). (6 marks)

(ii) Interpret the value of r. (2 marks)

(Total: 20 marks)

QUESTION FOUR

(a) In harsh economic conditions, the chances of a microfinance collapsing is 40%.

Required:

Determine the probability that out of five microfinances, four or five microfinances will collapse. (8 marks)

(b) A manufacturing company produces a single product that passes through two departments: assembly and packaging. production is made on order.

The following information relates to the product:

Revenue per unit, $R = 960 - 0.06q$ where q is the quantity sold.

Variable cost per unit in each department:

Assembly	VC_A =	$18 + 0.08q$
Packaging	VC_p =	$10.5 + 0.06q$

Fixed costs per annum:

Assembly	Sh.180,000
Packaging	Sh.220,000

Required:

(i) Total revenue function (TR). (3 marks)

(ii) Total cost function (TC). (3 marks)

(iii) Profit function and the expected profit. (6 marks)

(Total: 20 marks)

QUESTION FIVE

(a) Explain four principles followed in the construction of graphs. (8 marks)

(b) Maloba is a hawker at Huruma market. He sells shirts, blouses and shoes. The following information relates to the three items for the first three weeks of July 2015:

		Quantity			Sales
		Shirts	**Blouses**	**Pairs of shoes**	**Sh.**
Week	1	13	20	3	2,340
Week	2	15	12	1	1,900
Week	3	10	15	2	1,750

The selling prices remained the same over the 3-week period. Items are marked up at 25%.

Required:

(i) Formulate three simultaneous equations. (3 marks)

(ii) Determine the selling price and cost price of each item. (9 marks)

(Total: 20 marks)

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