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CAMS LEVEL I

FUNDAMENTALS OF BUSINESS MATHEMATICS

TUESDAY: 27 November 2018.

Time Allowed: 3 hours.

Answer any FIVE questions. ALL questions carry equal marks. Show ALL your workings.

QUESTION ONE

(a) Explain the following terms with reference to probability:

- (i) Mutually exclusive events. (2 marks)
- (ii) Independent events. (2 marks)
- (iii) Joint probability. (2 marks)
- (iv) Conditional probability. (2 marks)

(b) The procurement officer of XYZ Limited bought a printer at a cost of Sh.25,000. He later sold the printer at Sh.30,000.

Required:

- (i) The markup in percentage. (3 marks)
- (ii) The margin in percentage. (3 marks)

(c) The following data show the marks in percentage scored by 50 students in a Fundamentals of Business Mathematics examination:

23	54	44	37	20	23	36	54
26	32	40	28	21	27	27	29
27	44	65	30	57	42	24	32
47	32	43	49	54	36	27	33
40	49	41	34	19	32	38	37
38	45	19	18	33	37	32	31
29	39						

Required:

A grouped frequency table with class intervals of size 5 starting with 15 per cent.

(6 marks)

(Total: 20 marks)

QUESTION TWO

(a) Highlight two advantages and two disadvantages of the arithmetic mean as a measure of central tendency. (4 marks)

(b) The cost price of a calculator is Sh.3,000. The calculator is sold at a profit margin of 25%.

Required:

The ratio between cost price and selling price of the calculator.

(4 marks)

(c) A certain tailor makes 12 shirts and 8 trousers at a total cost of Sh.3,440. The cost of making 5 shirts and 11 trousers is Sh.1,970. The tailor makes a profit of 35% and 40% on cost on each shirt and trouser respectively.

Required:

- (i) The cost of making a shirt and a trouser. (4 marks)
- (ii) The selling price of a shirt and a trouser. (2 marks)
- (d) The following is an arithmetic progression:
-110, -38, 34,

Required:

- (i) The 10th term. (3 marks)
- (ii) The sum of the first 10 terms. (3 marks)
- (Total: 20 marks)**

QUESTION THREE

- (a) Highlight six principles that guide the construction of graphs. (6 marks)
- (b) A manufacturer makes two products, namely product Q and product M. The cost of making 15 units of product Q and 10 units of product M is Sh.600. The cost of making 5 units of product Q and 8 units of product M is Sh.340.

Required:

- (i) Express the above costs of making one unit of product Q and product M in the form of simultaneous equations. (2 marks)
- (ii) The cost of making one unit of product Q and one unit of product M. (4 marks)
- (c) Michael Mwambire bought a machine worth Sh.108,000 on hire purchase terms. He paid an initial deposit of 30%. A flat rate interest of 15% is charged on the outstanding balance. The balance plus the interest is to be paid in 12 equal instalments.

Required:

- (i) Initial deposit paid by Michael Mwambire. (2 marks)
- (ii) Interest charged on the outstanding balance. (3 marks)
- (iii) Amount of monthly instalment paid by Michael Mwambire. (3 marks)
- (Total: 20 marks)**

QUESTION FOUR

- (a) Solve for x in the following equations:
- (i) $2^{2x-3} = 128$. (2 marks)
- (ii) $2(4x - 2) = 3(x + 2)$ (2 marks)

- (b) Abdi Hassan wishes to invest Sh.1,000,000 in a fixed deposit account and he has two options:

Option I

To invest in a fixed deposit account with a commercial bank at a simple interest rate of 10% per annum for 3 years.

Option II

To invest in a fixed deposit account with a housing finance corporation at an interest rate of 8% compounded semi-annually for 3 years.

Required:

Advise Abdi Hassan on the better option to invest in. (6 marks)

- (c) Pesa Bank Limited has collected the following data representing the total monthly incomes (in Shillings) of a sample of 80 account holders:

Monthly income (Sh.)	Frequency
5,000 - 10,000	2
10,000 - 20,000	3
20,000 - 30,000	5
30,000 - 40,000	10
40,000 - 50,000	15
50,000 - 80,000	26
80,000 - 100,000	19

Required:

- (i) The mean monthly income. (3 marks)
- (ii) The median monthly income. (3 marks)
- (iii) The modal monthly income. (4 marks)
- (Total: 20 marks)**

QUESTION FIVE

- (a) John, James and Jacob carried out a job in one day for which they were paid a total of Sh.5,120. John received $\frac{3}{8}$ and Jacob received $\frac{3}{16}$ of the total amount. The balance was received by James.

Required:

- (i) Fraction of James' share. (2 marks)
- (ii) The amount of money received by each of them. (3 marks)
- (b) 30 men working 8 hours a day can complete a job in 50 days.

Required:

The number of hours 20 men will be required to work every day in order to complete the job in 40 days. (5 marks)

- (c) The original price of a television set was Sh.45,000. The price was increased by 20% then it was reduced by 30%.

Required:

The current price of the television set. (4 marks)

- (d) ABC Limited borrowed Sh.1,000,000 from a bank at an interest rate of 18% per annum compounded semi-annually. No payments were made in the course of a 5-year period.

Required:

The amount of money ABC Limited owed the bank after 5 years. (6 marks)

(Total: 20 marks)

QUESTION SIX

- (a) Distinguish between "primary data" and "secondary data". (4 marks)

- (b) Given the sequence:

$$-\frac{1}{3}, -1, -3, -9, -27, \dots$$

Obtain the next three terms in the sequence.

(3 marks)

- (c) Given that:

$$y = 3x^3 + 2x^2 + x$$

- (i) Differentiate the above function with respect to x. (2 marks)

- (ii) Find the value of the derivative in (c)(i) above when $x = 3$. (3 marks)

(d) Solve the following linear equation:

$$\left(\frac{6x}{7}\right) - \left(\frac{3x-1}{5}\right) = 2$$

(4 marks)

(e) Find the value of x in the following quadratic equation.

$$4x^2 - x - 3 = 0$$

(4 marks)

(Total: 20 marks)

QUESTION SEVEN

(a) Define the following terms with reference to matrices:

- (i) Null matrix. (2 marks)
- (ii) Scalar matrix. (2 marks)
- (iii) Diagonal matrix. (2 marks)
- (iv) Inverse matrix. (2 marks)

(b) An American tourist visited your country with 20,380 Sterling pounds and 4,100 US dollars. The currency of your country is Shillings. He exchanged all the foreign currency into Shillings. The tourist stayed in your country for two months spending Sh.40,000 per day. He bought gifts worth Sh.300,000 and an air ticket for Sh.100,000.

Upon leaving the country, he exchanged the remaining cash into US dollars.

The rates of exchange during his visit were as follows:

1 US dollar = Sh.90

1 Sterling pound = Sh.135

Assume one month has 30 days.

Required:

- (i) The amount in Shillings that the tourist received on exchanging the Sterling pounds and the US dollars. (3 marks)
- (ii) The amount of money the tourist received in US dollars after exchanging the balance of Shillings left at the end of his visit. (3 marks)

(c) Julius Chapa earns a salary which he spends as follows:

$\frac{1}{5}$ of the salary on house rent.

$\frac{1}{3}$ of the salary on his children's school fees.

$\frac{1}{10}$ on food, $\frac{1}{4}$ on clothing, $\frac{1}{20}$ on entertainment and the balance on miscellaneous expenditure.

In the month of June 2018, his pocket money was Sh.18,000.

Required:

- (i) The salary earned by Julius Chapa in June 2018. (3 marks)
- (ii) The amount of money used on each of the above items of expenditure. (3 marks)

(Total: 20 marks)

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