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CAMS LEVEL I

FUNDAMENTALS OF BUSINESS MATHEMATICS

WEDNESDAY: 27 November 2019. **Time Allowed: 3 hours.**

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

QUESTION ONE

(a) List four factors that should be considered when collecting data for a particular investigation. (4 marks)

(b) The following data show the percentage marks scored by 30 students in a certain examination:

13	43	26	15	10
17	14	25	14	33
29	9	12	38	20
38	29	20	13	18
24	32	18	47	25
39	24	16	33	7

Required:

(i) A grouped frequency table starting with the class of 5 – 10 using the exclusive method. (6 marks)

(ii) The mean mark. (3 marks)

(iii) The standard deviation of the marks. (5 marks)

(iv) The coefficient of variation. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) Define the following terms:

(i) Rate. (2 marks)

(ii) Ratio. (2 marks)

(iii) Proportion. (2 marks)

(b) Ahmed Yusuf bought a television set on cash basis. He was offered a trade discount of 25% on the list price and a further 10% cash discount after the trade discount.

Required:

(i) The list price of the television set assuming that Ahmed Yusuf paid Sh.2,700 for it. (4 marks)

(ii) The selling price of the television set assuming that Ahmed Yusuf wishes to make a profit markup of 20%. (2 marks)

(c) A motor vehicle dealer imported 5 vehicles from the United Kingdom (UK) at a price of 32,000 Sterling pounds (£) per vehicle. The importer is required to pay an import duty of 25% on cost. He is also required to pay transportation expenses of Ksh.1,000,000.

1 Sterling pound (£) = Ksh.125.

Required:

(i) The total cost incurred by the motor vehicle dealer in Kenya shillings. (6 marks)

(ii) The selling price per vehicle assuming that the vehicle dealer intends to earn a profit of 12.5% on cost. (2 marks)

(Total: 20 marks)

QUESTION THREE

(a) Simplify the following expression:

$1\frac{3}{4} - (\frac{2}{3} \times \frac{3}{4}) + (1\frac{1}{2} \div \frac{2}{3}) - \frac{1}{2}$ (5 marks)

(b) A car cost Sh.896,000 when it was new five years ago. It depreciated at the rate of 15% during the first year and thereafter at the rate of 8% per annum.

Required:
The value of the car after 5 years. (4 marks)

(c) Halima Mwandawiro earns an annual salary of Sh.1,152,000. She receives a house allowance of Sh.36,000 per month, a medical allowance of Sh.13,478.40 per month and a travelling allowance of Sh.4,656 per month. She receives a personal relief of Sh.15,360 per annum. The following monthly bands of taxable income are applicable for the year.

Annual income (Sh.)	**Tax rate**
0 – 147,580	10%
147,580 – 286,623	15%
286,623 – 425,666	20%
425,666 – 564,709	25%
564,709 and above	30%

Required:
Determine the annual tax payable by Halima Mwandawiro. (8 marks)

(d) A trader sold an item to a wholesaler at a profit of 20% on cost. The wholesaler then sold the item to a retailer for Sh.2,400 at a profit of 25% on cost.

Required:
(i) The cost of the item to the trader. (2 marks)

(ii) The profit the trader would have made assuming he had sold the item directly to the retailer. (1 mark)

(Total: 20 marks)

QUESTION FOUR

(a) A small company borrows Sh.280,000 from a bank at an interest rate of 18% per annum compounded semi-annually.

Required:
Assuming that no repayments are made, compute the amount owed to the bank after 4 years. (6 marks)

(b) Jikaze Ltd. obtained a loan from Uwezo Bank Ltd. The amount of interest payable in the first month is Sh.12,000, in the second month Sh.11,750 and in the third month Sh.11,500. The interest is computed on a reducing balance basis.

Required:
Compute the total interest paid on the loan over a period of 42 months. (6 marks)

(c) The following data show the number of students enrolled in various courses at Elimu School of Accountancy for the last five years:

	CPA	**CS**	**CIFA**
Year 2013	81	32	2
Year 2014	85	46	4
Year 2015	90	62	9
Year 2016	77	59	14
Year 2017	97	90	28

Required:
Present the above data in the form of a percentage component bar chart. (8 marks)

(Total: 20 marks)

QUESTION FIVE

(a) State the two laws of probability. (4 marks)

(b) Vera Omondi recently won a prize in a lottery. She has decided to gift her husband with 30% of the prize, 25% to her mother, 15% to each of her two sons, 50% of the remainder to her brother and the rest she will donate to charity.

The donation to charity amounted to Sh.75,000.

Required:
The amount of money received by each of the above beneficiaries. (6 marks)

(c) Solve the following simultaneous linear equations:

$6x + 2y = 600$
$7x + 4y = 800$

(6 marks)

(d) Differentiate the following functions:

(i) $Y = -3x^3 + x^2 + 9x + 50$, with respect to x. (2 marks)

(ii) $Z = y^{\frac{1}{2}} + \frac{1}{3}y + 5$, with respect to y. (2 marks)

(Total: 20 marks)

QUESTION SIX

(a) Three partners A, B and C contributed Sh.2,250,000, Sh.1,350,000 and Sh.900,000 respectively to start a business venture. The partners' agreement provides that 45% of their business profits shall be divided equally among the partners and the balance shall be divided in the ratio of their capital contributions. During the year 2018, the total profit realised by the business amounted to Sh.1,282,500.

Required:
Determine the amount of profit each partner received during the year 2018. (6 marks)

(b) The following table shows a frequency distribution of marks obtained by 112 candidates in an entrance examination with a pass mark of 40%.

Marks (%)	Frequency
1 – 10	3
11 – 20	9
21 – 30	10
31 – 40	12
41 – 50	20
51 – 60	22
61 – 70	18
71 – 80	14
81 – 90	4

Required:

(i) Construct a less than cumulative frequency curve. (6 marks)

(ii) Estimate the percentage of candidates who failed the examination. (4 marks)

(iii) Estimate the percentage of candidates who scored between 40 and 74 marks. (4 marks)

(Total: 20 marks)

QUESTION SEVEN

(a) Simplify the following:

(i) $3^{n+1} \times 9^{n} \div 27^{\frac{2n}{3}}$ (3 marks)

(ii) $2 \log a + 3 \log b - \log c$. (3 marks)

(b) Solve the following equations:

(i) $2^{x} \times 2^{x+1} = 10$. (3 marks)

(ii) $5^{y-3} \times 25^{y+2} = 625$. (3 marks)

(c) Given that $A = \begin{pmatrix} 4 & -2 \\ 4 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix}$

Required:

(i) Determine A^{-1}, the inverse matrix of A. (2 marks)

(ii) Solve the matrix equation $AX = B$; where X is a 2 x 2 matrix. (6 marks)

(Total: 20 marks)

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