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CAMS LEVEL I

FUNDAMENTALS OF BUSINESS MATHEMATICS

TUESDAY: 31 August 2021.

Time Allowed: 3 hours.

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

QUESTION ONE

- (a) (i) John Thoya drove 343 kilometres on the first day of his trip. He intends to continue driving at the same speed.

Required:

The number of days that John Thoya will require to drive the remaining 1,200 kilometres. (3 marks)

- (ii) Your next-door neighbour has spent 10 hours a week to landscape his $\frac{1}{2}$ acre property. You are thinking about landscaping your $\frac{1}{3}$ acre property in exactly the same way.

Required:

The number of hours a week that you will have to spend to landscape your property. (3 marks)

- (b) (i) Express the fraction $\frac{2x + 6xy}{4x^2 + 10x^3}$ in its simplest form. (3 marks)

- (ii) Express $\frac{1}{x+1} - \frac{1}{x-1}$ as a single fraction. (3 marks)

- (c) (i) Jacob Otieno is the Assistant Manager of a clothing store. He earns Sh.35,000 per month. He also receives a 5% commission on the first Sh.900,000 sales and 6% on sales over Sh.900,000.

Required:

Jacob Otieno's total earnings if he sold Sh.1,700,000 worth of clothes in July 2021. (4 marks)

- (ii) A trader buys a juice blender at Sh.18,000 and sells it through an agent after paying him a commission of 4% on the selling price.

Required:

The selling price of the juice blender assuming that the trader makes a net profit of 20% on cost. (4 marks)

(Total: 20 marks)

QUESTION TWO

- (a) A del credere agent charges a 3% commission on cash sales and a 6% commission on credit sales. His average commission on total sales is 4.3%.

Required:

The ratio of cash sales to credit sales. (6 marks)

- (b) A merchant employed an agent to buy and sell a certain product. The agent charged a commission of 3% on the purchase price and 2% on the sale price. The purchase price was Sh.40,000. After deducting the commissions, the merchant made a net profit of 19.5% on the purchase price.

Required:

The sale price of the product. (4 marks)

- (c) A trader allows a trade discount of 8% on the list price of his goods and a further discount of 2% for cash payment and still makes a profit of 12.7% on the cost price.

Required:

The percentage mark-up on cost price.

(5 marks)

- (d) A, B and C are partners in a business and have contributed Sh.200,000, Sh.350,000 and Sh.450,000 respectively as capital. They share profits or losses in the ratio of capital contributed. At the end of the year, the partnership business made Sh.1,370,500 as profit.

Required:

The share of profit of each partner.

(5 marks)

(Total: 20 marks)

QUESTION THREE

- (a) Explain the following terms as used in probability:

(i) Dependent events. (2 marks)

(ii) Joint probability. (2 marks)

(iii) Mutually exclusive events. (2 marks)

(iv) Conditional probability. (2 marks)

(v) Independent events. (2 marks)

- (b) Solve the following equations:

(i) $3^{4x-6} = 81$ (2 marks)

(ii) $3(2x-3) = 2(x+4)$ (2 marks)

- (c) A motor vehicle costs Sh.1,250,000 and has a useful life of 6 years and a residual value of Sh.50,000. In the first 3 years, the motor vehicle was depreciated on a straight line basis and in the next 3 years using the reducing balance method.

Required:

The reducing balance annual rate of depreciation in the last 3 years given the same expected residual value. (6 marks)

(Total: 20 marks)

QUESTION FOUR

- (a) James Nzila has received a lumpsum payment from his pension scheme. He has decided to gift 30% of the lumpsum payment to his wife, 20% to his son, 10% to his daughter, 50% of the remainder to his mother and the rest to his local church. His mother received Sh.100,000.

Required:

The amount received by each of the above beneficiaries.

(6 marks)

- (b) Differentiate the following functions:

(i) $Y = -4x^3 + x^2 + 6x + 30$ with respect to x . (3 marks)

(ii) $Z = 16y^{1/2} + \frac{1}{3}y^3 + 6$ with respect to y . (3 marks)

- (c) Solve the following simultaneous equations using the matrix method:

$$105X + 224Y = 61,320$$

$$245X + 96Y = 40,680$$

(8 marks)

(Total: 20 marks)

QUESTION FIVE

- (a) Distinguish between “primary data” and “secondary data”. (4 marks)
- (b) Highlight two advantages and two disadvantages of the “arithmetic mean” as a measure of central tendency. (4 marks)
- (c) The table below shows the distribution of profits made by 150 companies in a given country:

Profit Sh. “million”	Number of companies
5-10	10
10-15	18
15-20	20
20-25	30
25-30	18
30-35	12
35-40	20
40-45	12
45-50	8
50-55	2

Required:

- (i) A “less than” and “more than” ogive for the above data. (10 marks)
- (ii) Estimate the median profit from the ogives obtained in (c) (i) above. (2 marks)

(Total: 20 marks)**QUESTION SIX**

- (a) A businessman deposits Sh.1,500 in a bank account in the first month. He deposits into the account in every consecutive month an amount that increases by 20% of the initial amount deposited.

Required:

- (i) The amount deposited during the 25th month. (2 marks)
- (ii) The total amount in the bank account at the end of the 48th month. (4 marks)

- (b) The following table summarises the marks scored by 220 students of a commercial college in a Business Statistics test:

Marks (%)	Frequency
11-20	2
21-30	20
31-40	32
41-50	36
51-60	58
61-70	46
71-80	20
81-90	6

Required:

- (i) The mean mark. (2 marks)
- (ii) The standard deviation of the marks scored. (4 marks)
- (iii) The modal mark. (2 marks)

- (c) A non-governmental organisation intends to select an employee from some 140 male and female applicants from County A and County B. The following table provides a summary of this information:

	Gender	
	Male	Female
County A	32	28
County B	44	36

Required:

- (i) The probability that the selected person is from County A or a female. (3 marks)
- (ii) The probability that the chosen person is male given that he is from County B. (3 marks)

(Total: 20 marks)

QUESTION SEVEN

- (a) You are given the quadratic function $y = 4x^2 - 4x - 3$ for the domain $-2 \leq x \leq 3$.

Required:

- (i) Draw the quadratic graph/curve of the function for the domain $-2 \leq x \leq 3$. (6 marks)
- (ii) Using the results obtained in (a) (i) above, solve the equation $4x^2 - 4x - 3 = 0$ (2 marks)

- (b) A Kenyan businessman imports 1,700 gold chains at a cost of US\$ 180 each, 150 electronic gadgets at a cost of £75 each, and 950 machine parts at a cost of €67 each. He incurs a 5% customs duty on the cost of imports, Ksh.500,000 on freight and € 600 on insurance.

Required:

- (i) The total cost of the consignment in Kenya Shillings (Ksh.) (3 marks)
- (ii) The total profit in Euros (€) that the businessman earns if he sets a 10% markup on the cost of the gold chain, 15% markup on the cost of the electronic gadgets and 20% markup on the cost of the machine parts.

The following exchange rates are applicable:

1 US \$	=	Ksh.108
1 £	=	Ksh.150
1 €	=	Ksh.128

(3 marks)

- (c) Mr. Ismail Mwankale deposits Sh.850,000 in his bank account for 3 years where interest is paid at the rate of 12% per annum compounded quarterly. At the end of year 3, he withdraws Sh.240,000 from the account. He intends to buy a certain machine after another 2 years that will cost Sh.1,560,000.

Required:

The amount he should deposit in his bank account after 3 years to enable him buy the machine.

(6 marks)

(Total: 20 marks)

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