KASNEB

ATD LEVEL II

DCM LEVEL II

BUSINESS MATHEMATICS AND STATISTICS

PILOT PAPER

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

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

QUESTION ONE

(a) A retailer bought a machine with a cash price of Sh.600,000 on hire purchase terms. He paid an initial deposit of 25 percent of the cash price. An interest of 20 percent is charged on the outstanding balance for the period of repayment. The balance plus the interest is payable in 36 equal monthly instalments. A customer who purchases the machine on cash basis is given a 20% discount on the cash price.

Required:

Calculate the amount of money the retailer would have saved had he bought the machine on cash basis. (5 marks)

(b) A salesman earns a fixed salary per month and a commission based on total sales made in a given month. During the month of June and July 2014, the salesman's total earnings were Sh.936,000 and Sh.1,170,000 respectively. The total sales for corresponding months of June and July were Sh.12,150,000 and Sh.18,000,000 respectively.

Required:

(i) Determine the salesman's rate of commission. (3 marks)

(ii) The salesman's fixed monthly salary. (2 marks)

(iii) The total sales the salesman has to make in order to earn a total monthly salary of Sh.1,035,000. (2 marks)

(c) A trader intends to purchase a machine worth Sh.255,150 to be paid in two years time. He plans to invest a certain amount of money in a co-operative society such that the sum at the end of the first year amounts to Sh.236,250 and at the end of the second year, the amount will be enough to pay for the machine.

Required:

(i) Calculate the rate of interest if compounding is done annually. (3 marks)

(ii) Calculate the rate of interest if compounding is done quarterly. (3 marks)

(iii) Calculate the amount to be invested in two years in order to purchase the machine if interest is compounded quarterly. (2 marks)

(Total: 20 marks)

QUESTION TWO

(a) The table below shows daily wages of casual employees in an agricultural firm:

Wages (Sh.)	Number of employees
500 - 600	8
600 - 700	10
700 - 800	16
800 - 900	14
900 - 1000	10
1000 - 1100	5
1100 - 1200	2

Required:

(i) Using the 3rd class, distinguish between the terms class limit, class interval and class boundary. (3 marks)

(ii) Calculate the mean daily wage. (3 marks)

(iii) Determine the semi-interquartile range of the employees daily wage. (6 marks)

(b) State two advantages and two disadvantages of using secondary data as a method of data collection. (4 marks)

(c) Outline the steps followed in compiling primary data. (4 marks)

(Total: 20 marks)

QUESTION THREE

(a) Ten new products have been developed by a health foods firm. The management believes that the long run success of the products will depend on superior product characteristics P, consumer satisfaction S and competitive advantage C. The marketing department has indicated that of the ten products, six meet the superior product criteria P, five meet the consumer satisfaction criteria S, while seven meet the competitive advantage C. Three of the products each meet the two of the required criteria.

Required:

(i) Represent the above information in a venn diagram. (7 marks)

(ii) Using the venn diagram in (i) above, write the event that a product possesses all the desired characteristics. (2 marks)

(b) An electronics company has a new line of product P. Research suggests that the daily sales for the new product is given by the function $y = -P^2 + 120p + 1400$, where P is the price per unit.

Required:

Calculate the maximum daily sales of product P. (4 marks)

(c) Given the following matrices: $A = \begin{pmatrix} 1 & -2 \\ 0 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 5 \\ -3 & 6 \end{pmatrix}$

Required:

(i) Show that $AB \neq BA$. (3 marks)

(ii) Show that $AA^{-1} = A^{-1}A = 1$. (4 marks)

(Total: 20 marks)

QUESTION FOUR

The table below shows average wholesale prices and production of potatoes, tomatoes and carrots for the years 2012, 2013 and 2014 in a certain county:

	PRICES (SHS. PER KG.)			QUANTITIES (MILLIONS KG.)		
Year	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**
Potatoes	40	45	50	960	970	1020
Tomatoes	65	67	59	118	115	125
Carrots	35	46	38	80	75	85

Required:

(a) Calculate simple aggregate wholesale price index for the year 2014 using:

(i) 2012 as the base year. (2 marks)

(ii) 2013 as the base year. (4 marks)

(b) Compute Lasperyre's price index and Paasche's price index using 2012 and 2013 as the base years. (10 marks)

(c) Interpret results obtained in part (b) above. (4 marks)

(Total: 20 marks)

QUESTION FIVE

(a) An investment analyst collects data on shares and notes whether or not dividends were paid and whether or not the shares increased in price over a certain period.

- Of all the 112 shares that paid dividends, 78 shares had not increased in price.
- Of all the 127 shares that had no price increase, 49 shares did not pay dividends.
- The total number of shares analysed were 246.

Required:
Represent this data on a contingency table. (4 marks)

(b) Based on (a) above, determine the probability that:

(i) A share paid dividends. (2 marks)

(ii) A selected share neither paid dividends nor increased in price. (2 marks)

(iii) A selected share paid dividends given that it had increased in price. (2 marks)

(iv) A selected share either increased in price or paid dividends or both. (2 marks)

(c) A real estate specialist believes that during periods of high economic growth, properties will appreciate with a probability of 0.8, in periods of moderate economic growth, 0.30, during periods of low economic growth, 0.20. During any period of time, the probability of high economic growth is 0.30, the probability of moderate growth is 0.50 and the probability of low economic growth is 0.20. During the present period property has been undergoing appreciation.

Required:

(i) Determine the probability that the economic growth is high. (4 marks)

(ii) Determine the probability that the economic growth is low. (4 marks)

(Total: 20 marks)

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