S475/1
Subsidiary
mathematics
Paper 1
August
$2\frac{2}{3}$ Hours

ELITE EXAMINATION BUREAU MOCK 2019

Uganda Advanced Certificate of Education

SUBSIDIARY MATHEMATICS

PAPER 1

2 Hours 45Minutes

INSTRUCTIONS TO CANDIDATES

- *Answer all the* ***eight****(8) questions in section* ***A*** *and any* ***four*** *questions in section* ***B****.*
- *Each question in section* ***A*** *carries* ***5marks*** *while each question in section B carries 15 marks.*
- *A graph paper is provided.*
- *Begin each answer on a fresh sheet of paper.*
- *A mathematical table with a list of formulae and a silent non-programmable scientific calculators may be used.*
- *For numerical work, assume acceleration due to gravity* $\boldsymbol{g = 10ms^{-2}}$.
- *No paper is provided for rough work.*

Turn Over

SECTION A (40 MARKS)
Answer all questions in this section

1. The heights (in cm) of a sample in a certain school were recorded as follows. 120, 132, 118, 141, 128, 134, 127, 138, 128, 145, 130. Calculate the inter quartile range. (5marks)

2. Find the expression for Q given that $\frac{dQ}{dp} = 5 - 4p$.Given that q = 10 when P = 0. (5marks)

3. Given the events A and B such that $P(A) = \frac{3}{5}, P(B) = ¾$ and $P(AUB) = \frac{9}{10}$
   (i) Find P(AnB) if A and B are independent events. (3marks)
   (ii) Find $P(AuB)^1$ if A and B are mutually exclusive events or disjoint events. (2marks)

4. The first and last terms of an arithmetic progression are -3 and 58 respectively. The sum of all the terms of the progression is 5060. Find the number of terms and the common difference. (5marks)

5. Given the matrix m = $\begin{pmatrix} 3 & 2 \\ 1 & 4 \end{pmatrix}$ and I is a $2x\ 2$ identity matrix, determine the values of λ for which $det(m - \lambda I) = 0$ (5marks)

6. Given that $a = -2i + 4j, b = -5i + 10j$and $C = 3i + 4j$, find the angle between $(a + b)$ and C^1. (5marks)

7. Solve the simultaneous equations
   $\log_{10} x - \log_{10} y = \log_{10} 2.5$
   $\log_{10} x + \log_{10} y = 1$ (5marks)

8. The table below shows the average termly marks scored in mathematics tests by a certain student from his/her SI in 1989 to his/her S.4 in 1992.

Year	**Termly marks (%)**		
1989	36	50	54
1990	40	45	60
1991	39	46	70
1992	49	50	48

Calculate the three point moving averages for the date. (5marks)

SECTION B (60MARKS)

Answer only for questions in this section.

9. a) Solve $2sec^2X = 3 + tanx$ where $0^o \leq x \leq 360^0$

b) P and q are vectors such that P =2i – 3j and q = 6i + 4j, find

(i) the angle between P and Q

(ii) find |2p + 4q| (5marks)

10. Solve for x in the equations

a) $\log_5 x + \log_x 5 = 2.5$ (5marks)

b) $3(4^x) + 8(2^x) + 4 = 0$ (7marks)

11. The height and masses of ten students are given in the table below.

Height (cm)	156	151	152	146	160	157	149	142	158	141
Mass (kg)	62	58	63	58	71	60	55	57	68	56

a(i) plot the data on a scatter diagram. (6marks)

(ii) Draw the line of best fit. Hence estimate the mass corresponding to a height of 155cm. (3marks)

b) Calculate the rank correlation co-efficient for the data and comment on your results. (6marks)

12. a) A random variable X has the following distribution.

P(X =0) = P(X = 1) = 0.1, P(X=2) = 0.2,

P(X = 3) = P(X = 4) = 0.3. Find the mean and variance of X. (6marks)

b) The probability that a bakery will have sold all of his loaves X hours after baking is given by the p.d.f

$$f(x) = \begin{cases} K(36 - x^2), 0 \leq x \leq 6 \\ 0 \quad\quad else\ where \end{cases}$$

i) Determine the value of K (4amrks)

ii) Calculate the mean value (5marks)

13. The table below shows the prices (in Ugshs) of some food items in January, June and December together with the corresponding weights.

Item	**Price (in Ugshs)**			
	Jan	June	December	Weight
Matooke (1bunch)	15,000	13000	18000	4
Meat (1kg)	6500	6000	7150	1
Posho (1kg)	2000	1800	1600	3
Beans (1Kg)	2200	2000	2860	2

Taking January as the base month, calculate the

a) Simple aggregate price index for June comment on your result.

b) Weighted aggregate price index for December comment on your result.

14. The roots of the equation $2x^2 - 6x + 7 = 0$ are $\propto$ $and\ \beta$ determine the

a) Values of $(\propto - \beta)^2$and $\frac{1}{\propto^2\beta} + \frac{1}{\propto\beta^2}$. (12marks)

b) Quadratic equation with integral coefficient whose roots are $(\alpha - \beta)^2\ and\ \frac{1}{\propto^2\beta} + \frac{1}{\alpha\beta^2}$. (3marks)

END