

MOCK EXAMS 2018

Uganda Advanced Certificate of Education

SUBSIDIARY MATHEMATICS

Paper 1

2 hours 40 minutes

INSTRUCTIONS TO CANDIDATES:

- *Section A is compulsory*
- *Answer **FOUR** questions in section B*
- *Any additional question(s) answered will **not** be marked.*
- *Each question in section A carries 5 marks while each question in section B carries 15 marks.*
- *All working must be shown clearly*
- *Begin each answer on a fresh sheet of paper*
- *In numerical work take $g = 9.8 \text{ ms}^{-2}$.*
- *Mathematical tables with list of formulae and squared paper are provided.*
- *Silent, non – programmable scientific calculators may be used.*

SECTION A : (40 MARKS)

Answer all questions from this section

1. A curve passing through point A(0, 8) has a gradient function $2x + 5$. Find the equation of the curve. **(05 marks)**

2. Solve the equation;
 $3^{2x} - 3^x - 6 = 0$. **(05 mark)**

3. The mass (kg) of 10 candidates in Naalya S.S was recorded as follows, 60, 83, 72, 51, 64, 80, 75, 56, 90 and 85. Find the standard deviation. **(05 marks)**

4. A discrete random variable x has the following probability distribution:
 $P(X = 1) = 0.1$, $P(X = 2) = 2P(X = 4)$ and $P(X = 3) = 0.3$. Find;
(i) $P(X = 2)$
(ii) Expected value of x **(05 marks)**

5. Find the reflex angle θ such that;
 $2\sin^2\theta + \cos\theta + 1 = 0$ **(05 mark)**

6. Given that $\vec{OA} = 2\mathbf{i} + 2\mathbf{j}$ and $\vec{BA} = 7\mathbf{i} - \mathbf{j}$. Find;
(i) \vec{OB}
(ii) \vec{OM} , such that $\vec{AM} = \frac{1}{2} \vec{AB}$ **(05 marks)**

7. In 2014, the unit price of salt, price and cooking oil was 1600, 4200 and 3600 respectively. Given that the unit price in 2015 was P, 6800 and 3200 respectively and the simple aggregate price index was 125, find the value of P. **(05 marks)**

8. A car of mass 1.5 tonnes moves along a level road at a constant velocity of 80ms^{-1} . If its engine exerts a driving force of 5kN, find the resistance that the car is experiencing. **(05 marks)**

SECTION B

9. The table below shows the termly expenditure in thousands of shillings by a school on National water;

Year	Term I	Term II	Term III
2013	303	324	318
2014	336	345	330
2015	321	300	312
2016	339	342	x

- (a) Calculate the 3 – termly moving averages for the data. **(06 marks)**
 (b) On the same axes, plot the graphs of the 3 termly moving averages and the termly expenditure. **(07 marks)**
 (c) Use your graph to estimate the value of x . **(02 marks)**
10. (a) Sketch the curve;
 $y = x^2 - 2x - 3$ **(10 marks)**
 (b) Find the area bound by the curve and the x - axis. **(05 marks)**
11. The marks scored by candidates in a submaths exam were as follows;

64 74 78 59 67 55 61 54
 80 58 76 58 74 65 63 83
 72 60 71 52 61 57 68 69
 62 73 64 59 62 53 81 68
 50 75 67 53 80 77 60 71

- (a) Construct a grouped frequency table for the data using equal classes of width 4 marks starting with 50 – 53 as the first class. **(02 marks)**
 (b) State the;
 (i) Median class

- (ii) Modal class and its frequency. **(03 marks)**
- (c) Calculate the;
- (i) Mean mark
- (ii) Standard deviation **(10 marks)**
12. (a) Given that $A = \begin{pmatrix} 2 & 4 \\ -6 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} x & 2 \\ y & 5 \end{pmatrix}$. Find the value of x and y such that $AB = BA$. Hence determine matrix P where $P = AB = BA$. **(08 marks)**
- (b) Given the matrix $M = \begin{pmatrix} 1 & 3 \\ 2 & 2 \end{pmatrix}$. Find the value of λ for which matrix $N = M - \lambda I$ is singular, where I is a 2×2 identity matrix. **(07 marks)**
13. Forces of 7N, 8N, 6N, 4N, 6N and 7N and 7N act along the sides of a regular hexagon ABCDEF in the directions AB, CB, CD, DE, EF and FA respectively. Find the magnitude and direction of the resultant force taking AB as the horizontal axis. **(15 marks)**
14. A certain aptitude test has 10 statements that require a candidate to respond by writing true or false. A candidate passes if he or she scores at least eight questions correct;
- (a) Find the probability that;
- (i) A candidate gets exactly 5 questions correct
- (ii) A candidate passes the test **(09 marks)**
- (b) Calculate the expected number and standard deviation of the correctly answered questions. **(06 marks)**

SUCCESS