S475/1
SUBSID. MATHS
Paper 1
June 2017 2
_ hours.

Uganda Advanced Certificate of Education
Mock Examinations 2017
SUBSIDIARY MATHEMATICS
Paper 1
2 hours 40 minutes

INSTRUCTIONS TO CANDIDATES:

    Answer all the **eight** questions in section **A** and only **four** questions in
    section **B**.
    Any additional question(s) 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.
    Graph paper is provided.
    Silent non-programmable scientific calculators and mathematical tables
    with a list of formulae may be used.

FOR EXAMINERS USE ON Y		
	Section	**Mark**
Pure	**A**	
	B	
Statistics	**A**	
	B	
	Total Mark	

Section A (40 Marks)
(Answer **all** questions in this section)

Qn 1: Given that $\frac{1}{\sqrt{2}} - \frac{\sqrt{2}+1}{1+3\sqrt{2}} = a\sqrt{2} + b$ where a and b are constants, find the values of and .   [5]

Qn 2: The data below shows the marks obtained by 8 students in a certain test marked out of 30.

$$25, 20, 21, 23, 27, 23, 30, 23.$$

Find the:
(i).   Mean mark,
(ii). Modal mark,
(iii). Median mark.   [5]

Qn 3: If 3log (10+3)=6, find the value of .   [5]

Qn 4: A committee of 5 people is to be formed from a group of 6 men and 7 women.
  (a).   Find the number of possible committees.   [2]
   (b). What is the probability that there are only 2 women on the committee?   [3]

Qn 5: Given the vectors $= -2$, $=3 -$ and $= +2$, find the
$\underset{\sim}{} \quad \underset{\sim}{} \quad \underset{\sim}{}\underset{\sim}{} \quad \quad \underset{\sim}{}\underset{\sim}{} \quad \quad \underset{\sim}{} \quad \underset{\sim}{} \quad \underset{\sim}{}$

  length of the vector $5 - +3$.   [5]
$\quad\quad\quad\quad\quad\quad\quad\quad\underset{\sim}{} \quad \underset{\sim}{} \quad \underset{\sim}{}$

Qn 6: Given that $!\sim"(72,225)$, find $P(45 \leq X < 90)$.   [5]

Qn 7: A and B are acute angles such that sin+=__ and sin,=$\overset{-}{}$. $\underset{5}{\overset{-}{}}$ Without the use of tables or a calculator, find the value of sin(+−,).   [5]

Qn 8: Find the constant force necessary to accelerate a car of mass 1000 kg from 15 m s^1 to 20 m s^1 in 10 seconds against a resistance of 270 N.
                                                                        [5]

Section B (60 Marks)
(Answer only **four** questions from this section)

Question 9:
The table below shows the marks obtained by 10 students in a subsidiary mathematics and history exams.

History	80	75	65	90	95	98	78	65	54	60
Sub-Math	70	85	70	90	92	88	76	70	73	76

(a).   (i).   Represent the above data on a scatter diagram.
         (ii). Draw the line of best fit.
         (iii). If the student scored 75% in history, predict his score in subsidiary
                mathematics using your line of best fit.
(b). Calculate the spearman's rank correlation coefficient and comment on
       your result.   [15]

Question 10:
A company that manufactures three types of radios requires diodes (D), valves (V), transistors (T) and capacitors (C). Sony requires 4 D, 3 V, 5 T and 2 C. Panasonic requires 4 V, 6 T and 1 C while Philips requires 2 D, 8 T and 5 C. The cost of each diode, valve, transistor and capacitor in thousands of shillings is 15, 5, 9 and 12 respectively.
(a).   Write down:
         (i). 3×4 matrix for the requirements of the radios.
         (ii). 4×1 matrix for the cost of the accessories.
         (iii). Use matrix multiplication to find the cost of manufacturing each
                 radio.
(b). If Sony radio, Panasonic and Philips are sold at shs. 200,000; 150,000 and
       160,000 each respectively. Use matrix method to find the
       percentage profit made by the company from sales of 20 Sony, 25
       Panasonic and 15 Philips.   [15]

Question 11:
(a).   The table below shows the probability distribution function of a discrete
         random variable X.

x	-1	0	1	2
$P(X=x)$	0.4	0.1	0.3	0.2

         (i).   Calculate $P(X<2 | X>0)$.   [4]
         (ii). Obtain the variance of X   [4]
(b). The pdf of a continuous random variable X is given by

$$f(x) = \begin{cases} 3kx^2 & ; & 1 \leq x \leq 3, \\ 0 & ; & elsewhere. \end{cases}$$

Find:

(i). the value of 9   [3] (ii). the expectation of X.   [4]

Question 12: A curve is such that $\frac{BC}{BD} = 3 - 24$ and a point $3(1,0)$ lies on the curve.

(a).   Find the:
   (i).   equation of the curve.   [3]
   (ii). co-ordinates of the points where the curve meets the x-axis. [3]
    (iii). co-ordinates and the nature of the stationary points.   [4]
(b). Sketch the curve in (a) above and find the area enclosed by the curve and the x-axis.   [5]

Question 13:
The table below shows the 3-point termly moving total scores of a student from S.1 over a period of three years.

Year	Term one	Term two	Term three
2014		1380	1215
2015	1020	915	870
2016	840	795	

(a). Calculate the 3-point moving averages for data.
(b). Represent the moving averages on a graph and comment on the trend of performance.
(c). Determine the moving totals in third term of 2016.

Question 14:
A train starts from station P and accelerates uniformly for 2 minutes reaching a speed of 72 km h^1. It continues at this speed for 5 minutes and then is retarded uniformly for a further 3 minutes coming to rest at station Q. Draw a velocity-time graph and use it to find the:
(i).   Time taken to cover the distance between P and Q in seconds.
(ii). Distance PQ in metres.
(iii). Average speed of the train.

(iv). Acceleration in m s^1 . [15]

END