

Name: ..... Adm. No .....  
 School: ..... Candidate's sign.....  
 Date: .....

121/1  
 MATHEMATICS  
 PAPER 1  
 OCT/NOV 2010  
 TIME: 2 ½ HOURS

## SOUTH –LINK EVALUATION TEST – 2010

### FORM THREE

Mathematics  
 Paper 1

**INSTRUCTIONS TO CANDIDATES:**

- Write **your name and admission number** in the spaces provided above
- This paper contains **two sections**; Section **I** and section **II**.
- Answer **all** the questions in section **I** and only **five** questions from section **II**.
- All workings and answers **must** be written on the question paper in the spaces provided below each question.
- Marks may be given for correct working even if the answer is wrong.
- Calculators and KNEC mathematical tables may be used **EXCEPT** where stated otherwise
- Show all the steps in your calculations, giving your answers at each stage in the spaces below each question

**For Examiner's Use Only;**

**Section I**

Questions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	<b>TOTAL</b>	
Marks																		

**Section II**

Questions	17	18	19	20	21	22	23	24	<b>TOTAL</b>	<b>GRAND TOTAL</b>	
Marks											

*This Paper consists of 12 printed pages Candidates should check the question paper to ensure that all the pages are printed as indicated and no question are missing.*

**SECTION I (50 MARKS)**  
*Answer ALL questions in this section*

1. Evaluate: (2mks)

$$\frac{2^{-1}}{2^{-2} - 2^{-3}}$$

2. A box contains 5 red, 2 yellow and 12 blue biro pens. Two biro pens are picked at random without replacement. Find the probability that only one of the biro pens picked is blue. (3mks)

3. From a survey carried out, the following information was entered in a field book.

To R	90	Y	
		240	180 to N
		180	
		120	60 to M
		X	

If XY is 360m and SM,RP and QN are the offsets.

- a) Sketch the field (1mk)

- b) Determine the area of the field in hectares. (3mks)

4. Elizabeth deposited sh. 4500 in a bank, which paid compound interest of 12% compounded semi annually. Calculate the interest she earned after 2 years. (3mks)

5. Determine the value of  $x$  that satisfies the equation (3mks)

$$\text{Log}(x + 5) = \text{Log} 4 - \text{Log}(x + 2)$$

6. List all the integral values of  $x$  which satisfy the inequalities (2mks)

$$2(2-x) < 4x - 9 < -x + 11$$

7. Use logarithms to evaluate; (4mks)

$$\left( \frac{0.6791 \times \sin 24^\circ}{\text{Log } 5} \right)$$

8. Given that the matrix below is a singular matrix, determine the possible values of  $x$ . (2mks)

$$\begin{pmatrix} 2x & x^2 \\ 2 & 1 \end{pmatrix}$$

9. The volume  $V\text{cm}^3$  of an object is given by (3mks)

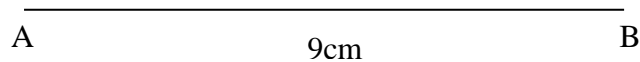
$$V = \frac{2}{3} \pi r^3 \left( \frac{1}{5c^2} - 2 \right)$$

Express C in terms of  $\pi$ , r, s and v

10. Find the ratio  $x : y$  if (2mks)

$$\frac{3x + 7y}{2x - y} = 5$$

11. On the line  $AB = 9\text{cm}$ , given below, construct  $\angle CAB = 60^\circ$  and hence subdivide the line  $AB$  into 7 equal proportional parts using line  $AC$  (3mks)



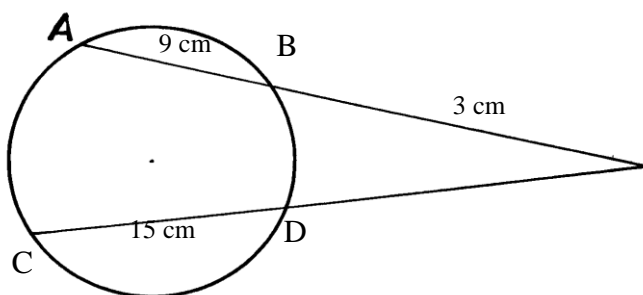
12. A right pyramid has a square base of  $10\text{cm}$  and slant height of  $15\text{cm}$  long. Draw its net and hence calculate the surface area. (3mks)

13. Two points P and Q are on the same side of a flag post such that the angle of elevation of the top of the flag post from P is  $50^\circ$ . If P is 5m from the flag post and the angle of depression of Q from the top of the flag post is  $30^\circ$ , find the distance between points P and Q. (3mks)

14. Use a ruler and a pair of compasses only in this question.

- a) Construct triangle ABC where  $AB = 6\text{cm}$ ,  $BC = 7\text{cm}$  and  $\angle ABC = 22\frac{1}{2}^\circ$  (2mks)  
b) Drop a perpendicular from C onto line BA produced and measure its length (1mk)

15. Find the length of DX in the figure below (2mks)



16. A straight line passes through the points  $(-3, 8)$  and  $(3, -4)$ . Find the equation of the perpendicular bisector of the line AB in the form  $y = mx + c$  (3mks)

**SECTION II (50MARKS)**

*Answer any five questions from this section.*

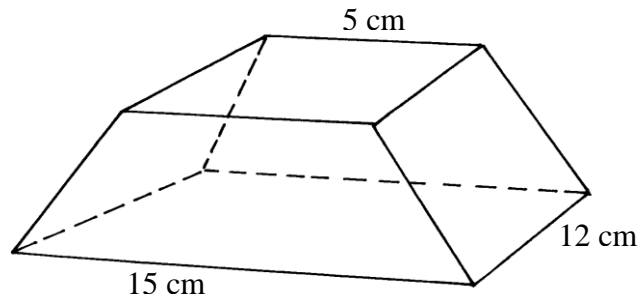
17. A number of people decided to raise sh. 800. They agreed to contribute each an equal amount of money. Later on four people withdrew, hence each of the remaining people had to contribute sh. 10 more to reach the target.

Calculate

- a) The number of people who were there initially. (7mks)

- b) The amount of money each, contributed after some withdrew with their contributions. (3mks)

18 The figure below shows a frustum of a rectangular based pyramid of vertical height 18cm.



Find the

a) Height of the pyramid.

(4mks)

b) Volume of the frustum.

(6mks)

19. Triangle ABC has vertices A (1,3) B (-2,-2) and C ( 4,-1) (10mks)
- i) Reflect  $\triangle ABC$  in the line  $x + y = 0$ , state the co-ordinates of A', B' and C' the images of A,B and C
  - ii) Reflect  $\triangle A'B'C'$  in the line  $y = 0$ .  
State the co-ordinates of A'', B'' and C'' the images of A', B' and C'
  - iii) Triangle ABC can be mapped onto A'' B'' C'' by rotation. Find by construction, the centre and angle of rotation.



20. Without using a set square or protractor construct:
- (a) Triangle ABC such that  $AB = 8\text{cm}$ ,  $BC = 6\text{cm}$  and  $\angle ABC = 30^\circ$  (2mks)
  - b) Measure the length AC. (1mk)
  - c) Draw a circle that touches sides AB, BC and AC (2mks)
  - d) Measure the radius of the circle (1mks)
  - e) Hence or otherwise calculate the area in the triangle but not in circle (4mks)

21. A square ABCD is such that A (-3,4) C (2,3). Equation of line AB is  $3y - 2x = 18$  and equation of line CD is  $3y - 2x = 5$ . Calculate

a) The gradient of line BC (2mks)

b) Equation of the line BC, leaving your answer in the form  $ax + by + c = 0$  (2mks)

c) Co-ordinates of Point B. (3mks)

d) Equation of line AD leaving you answer in the form  $ax + by + c = 0$  (1mk)

e) Co – ordinates of point D (2mks)

22. The table below shows the Length of 40 mango tree leaves.

Length (mm)	Frequency	Cumulative frequency
118 – 126	3	3
127 – 135	4	7
136- 144	10	17
145 – 153	12	29
154 – 162	5	34
163 – 171	4	38
172 - 180	2	40

Determine the;

a) (i) Modal class (1mk)

(ii) Median class (2mks)

b) (i) Mean length of the leaves (4mks)

(ii) Median of the leaves (3mks)

23. a) Complete the table below for the equation  $y = 3 + 2x - x^2$  (2mks)

X	-3	-2	-1	0	2	3	4	5
$-x^2$		-4		0		-9		
$2x$			-2		4			10
3	3	3	3	3	3	3	3	3
Y	-12			3				

(b) Draw the graph of  $y = 2x - x^2 + 3$  (4mks)

(c) Use your graph to find the values of x which satisfy the following equation. (2mks)

(i)  $5 + 2x - x^2 = 0$

(ii)  $2 + 3x - x^2 = 0$  (2mks)

24. a) The bearing of B and C from A is  $060^\circ$  and  $020^\circ$  respectively. A point D is due east of C and due North of B. It is further given that  $BC = CA = 30\text{km}$ . Using a scale of 1cm to represent 5km, make a scale drawing to show the relative positions of A, B, C, and D (5mks)

(b) Hence find;

(i) The distance of A from B (1mk)

(ii) The bearing of D from A (1mk)

(iii) The length of CD (1mk)

(iv) The bearing of B from C (1mk)

(v) The distance BD (1mk)