Name: …… Adm. No …….....

School: ……. Candidate's sign……

Date: ……

121/2

MATHEMATICS

PAPER 2

OCT/NOV 2010

TIME: 2 ½ HOURS

SOUTH –LINK EVALUATION TEST – 2010

FORM THREE

Mathematics
Paper 2

INSTRUCTIONS TO CANDIDATES:

- *Write **your name** and **Index 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	**TOTAL**
Marks																	

Section II

Questions	17	18	19	20	21	22	23	24	**TOTAL**
Marks									

GRAND TOTAL

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 questions are missing.

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

1. Evaluate without using mathematical tables or calculator. (3mks)

$$\sqrt{\frac{384.16 \times 0.0625}{96.04}}$$

2. A Kenyan tourist left Germany for Kenya through Switzerland, while in Switzerland she bought a watch worth 52 Deutsche mark. Find the value of the watch in

a) Swiss Francs (1mk)

b) Kenyan Shillings (2mks)

Use exchange rates below
1 Siwiss Franc – 1.28 Deutche mark.
1 Swiss Franc – 45.2 Kenyan shillings

3. The length of a rectangle is (3x+ 1) cm. its width is 3 cm shorter than its length. Given that the area of rectangle is 28cm^2. Find its length. (4mks)

4. The mean age of 12 girls is 18 years. One day when one of the girls was absent, the rest gave their ages as follows 21, 18, 19, 18, 20, 22, 17, 16, 18, 15, 17
Find the age of the absent girl. (2mks)

5. Samuel bought 5 shirts and 3 shorts paying a total of Kshs. 1750 Peter bought three similar shirts and one short for Ks 850. Find the cost of each item (2mks)

6. Factorise $a^2 - b^2$ (1mk)

Hence find the exact value of $6787^2 - 787^2$ (2mks)

7. Find the value of x if $9^x + 3^{2x-1} = 108$. (4mks)

8. The interior angle of a regular polygon is 20^O more than three times the exterior angle. Determine the number of sides of the polygon. (3mks)

9. Find the radius and centre of circle whose equation is $x^2 + y^2 + 4x - 6y + 10 = 0$ (4mks)

10. A quantity P varies directly as the square root of a quantity R and inversely as the square of quantity T. If quantity R is reduced by 5% while quantity T is increased by 10 %. Find the percentage change in quantity P (3mks)

11. Use tables of reciprocals only to work out. (3mks)

$$\frac{S}{0.396} + \frac{12}{09.593}$$

12. A lorry leaves Kisumu for Nairobi at 8.0 am at a constant speed of 80km/hr. at 9.00 a.m a saloon car leaves Nairobi for Kisumu at a constant speed of 140km/hr the two meet at a certain town A at 10.48 a.m. How far is Nairobi from Kisumu. (3mks).

13. Find the greatest number which when divided into 182 and 234 will always leave a remainder of 6 and 3 respectively. (3mks)

14. A student expands $(x + y)^2$ incorrectly as $x^2 + y^2$, find his percentage error if x = 4 and y = 6. (3mks)

15. Expand the following binominal hence find the constant term. (2mks)

$$\left(2x + \frac{1}{x}\right)^4$$

16. Simplify the surd $\frac{\sqrt{5} - 3\sqrt{3}}{\sqrt{5} + \sqrt{3}}$ in the form $a - \sqrt{b}$ hence find the values of rational numbers a and b (4mks)

SECTION II *(50 MARKS)*
Answer Any Five Questions in this section

17. The manger of a certain company is entitled to a monthly personal relief of Ksh. 3000 and her tax (PAYE) is Ksh. 9000 per month. She is also deducted NHIF sh. 350 per month, WCPS sh. 800 per month and cooperative shares sh.1200 per month,calculate.

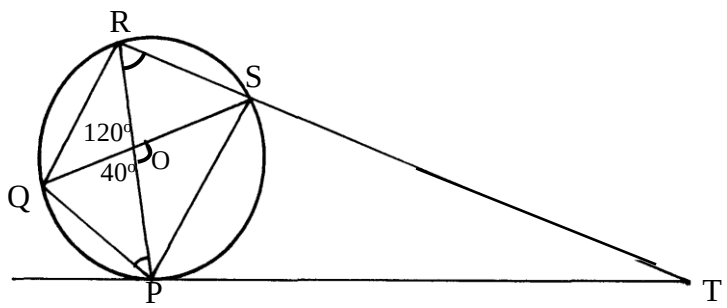
a) The manager's total deductions per month (1mk)

b) Total tax per month (1mk)

c) The manager's gross annual salary (6mks)

d) The Manger's monthly basic salary if her month's house allowance and medical allowances are Ksh. 10,000 and Ksh. 2000 respectively. (2mks)

18. In the figure below P,Q, R and S are points on the circumference of a circle centre O. the points T,S,O and Q lie on a straight line. P T is a tangent to the circle at P.



Find the values of the following angles stating reasons in each case.

a) $\angle$ SRP (2mks)

b) $\angle$ OQR (2mks)

c) $\angle$ RPT (2mks)

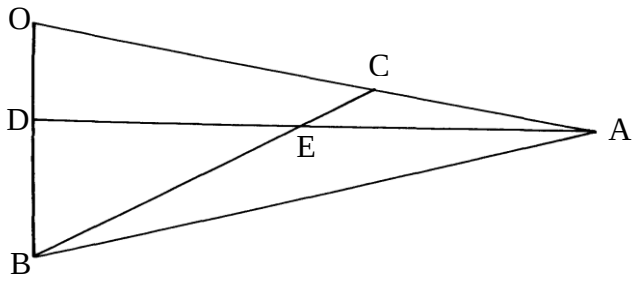
d) $\angle$ STP (2mks)

19. The twenty first term of an A.P is twice its ninth term. The sum of the first and the second terms of the same progression is 27. Calculate

a) The first term of the progression and its common difference. (5mks)

b) Given that the nth term of the progression is greater than 57. Find the least value of n; hence the value of that term (5mks)

20. In the figure below $\overrightarrow{OA} = \underset{\sim}{a}$ and $OB = \underset{\sim}{b}$. A point C divides OA in the ratio 2: 1 and D divides OB in the ratio 2: 3 Lines CB and $\overrightarrow{AD}$ intersects at E.



a) Express in terms of $\underset{\sim}{a}$ and $\underset{\sim}{b}$

(i) $\overrightarrow{BC}$ (1mk)

(ii) $\overrightarrow{AD}$ (1mk)

b) If $\overrightarrow{AE} = m\overrightarrow{AD}$ and $\overrightarrow{BE} + n\overrightarrow{BC}$ where m and n are constants. Express $\overrightarrow{OE}$ in terms of:

(i) $\underset{\sim}{a}$ $\underset{\sim}{b}$ and $\underset{\sim}{m}$ (2mks)

(ii) $\underset{\sim}{a}$ $\underset{\sim}{b}$ and $\underset{\sim}{n}$ (2mks)

c) Find the values of M and n in (b) above (4mks)

21. Three taps M, N and T fill a tank in 50 minutes, 25 minutes and 20 minutes respectively. The three taps are turned on and after 5 minutes tap T is closed. After another 3 minutes tap N is closed. How long will it take the remaining tap M to fill the tank (10mks)

22. (a) X, Y and Z are 3 bags. Bag X contains 2 blue balls and 3 red ones. Bag Y contains 3 blue balls and 4 red one while bag Z contains 1 blue ball and 2 red balls. A bag is chosen at random and two balls are picked at random, one after the other and without replacement.

i) Draw a tree diagram to represent the above information. (3mks)

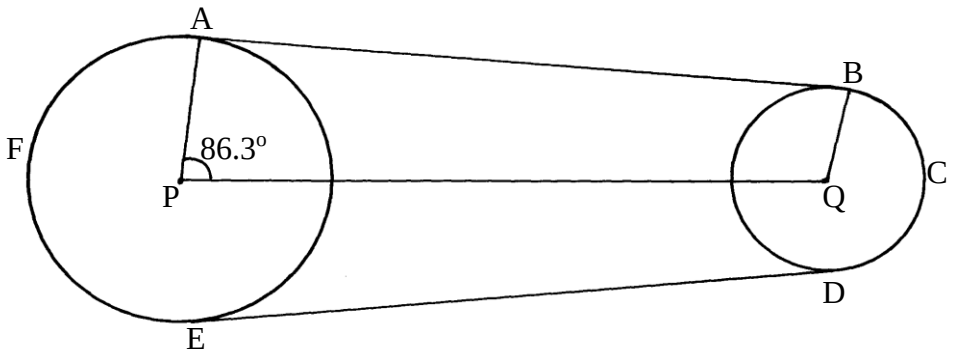
ii) Hence determine the probability of getting 2 blue balls (3mks)

b) During a certain motor rally, it is predicted that the weather will be either dry or wet. The probability that the weather will be dry is estimated to be 0.3. the probability for a driver to complete the rally during the dry weather is estimated to be ⅔. The probability for a driver not to complete the rally during wet weather is estimated to be $^4/_5$, what is the probability that;

i) The weather was wet and the driver completes the journey? (2mks)

ii) The driver completes the journey? (2mks)

23. The figure below shows a pulley belt round two circles of centers P and Q. The distance PQ = 30 cm and the radius of the circle centre P is 16 cm. Angle APQ = 86.3^{O}



a) Find;

i) The distance AB (3mks)

ii) The angle PQB (1mk)

iii) The length of the pulley belt (6mks)

24. The table below shows corresponding values of A and B that are known to satisfy the equation. $A = KB^n + 1.6$ where K and n are constants.

B	1.0	2.0	3.16	6.31	10.0
A	4.76	11.6	24.0	72.4	252.8

a) Draw a suitable straight line graph to represent the above information. (5mks)

b) Using the graph determine the values of k and n (4mks)

c) State the equation connecting A and B (1mk)