**NAME**:………………………………………………………………………………………..**INDEX NO**:………………………………

**SCHOOL**:……………………………………………………………………………………..**DATE**:………………………………………

 **SIGN**:……………………………………..

121/1

MATHEMATICS PAPER 1

MAY/JUNE 2019

TIME: 2 hrs.

FORM THREE

**ST. PETERS OF WANGA MIXED SECONDARY SCHOOL**

**Kenya Certificate of Secondary Education**

**INSTRUCTIONS TO CANDIDATES**

1. Answer all questions from section one of this paper and only five questions from section II
2. All your calculations must be clearly shown within the spaces provided for marks to be awarded.
3. No referring from text books or any other unauthorized materials. Failure to comply will result to a penalty.

**SECTION ONE**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

 TOTAL

**SECTION TWO**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|  |  |  |  |  |  |  |  |

 TOTAL

 **SECTION 1 (50MKS)**

*Answer all questions in this questions*

1. Without using tables or a calculator,evaluate

 0.08x0.54x√20.25 (3kmks)

 0.81x0.012

1. A large scale farmer uses of his land to plant maize, For planting beans, of the remainder for grazing and the rest for horticultural farming . If he uses 10 hectares for grazing, determine how much land he uses for horticultural farming. (4mks)
2. Onyango is now three times as old as his daughter and four times as old as his son. Eight years from now Onyango’s age will be twelve years more than the sum of the ages of his son and daughter. Find Onyango’s present age (4mks)
3. Find the equation of the line which passes through the point P(1, 3) and is perpendicular to the line whose equation is 2y-3x=7 (3mks)
4. Given the column vectors **a**=(), **b**=() and **c**= () and that p=2a-4b+3c. Express p as a column vector. (2mks)
5. Odongo left sh. 2116800 in his will to be shared between his wife, daughter and son in the ratio 1:2:3. His wife decided to devide her share equally between her daughter and son. Find how much the son finally got. (3mks)
6. Nyangesa spent a total of sh 970 on buying 3 text books and 5 pens. If he had bought 2 textbooks and 8 pens he would have saved sh.90. Find the cost of 2 text books. (3mks)
7. A Rectangular tank measures 62cm long, 50cm wide and contains water to a depth of 15cm. Three solid metal spheres of radius 7.7cm each are placed in the tank. Calculate to the nearest centimeter the new depth of water in the tank. (3mks)
8. The marked price of a Radio cassette player is sh. 12000. A trader solid it to a customer at 10% discount. If the trader still made a profit of 25% on the cost price, What was its cost price. (4mks)
9. The student population in a mixed secondary school is 600. On a particular day of the boys and of the girls attended a sports meeting. If 468 students were left behind, find how many more boys than girls attended the meeting. (4mks)

 11. A truck travelled from Nakuru to Sotik a distance of 150km. The average speed of the truck for the first 80km was 20km/h and the remaining part of the journey its average speed was 35km/h. Calculate the average speed for the whole journey. (3mks)

12. A business woman bought 20 toys in the United states for 250 dollars. He then spent 25% of the cost price in transporting the toys to Kenya. He later solid each toy at a profit of 40%.

Given that 1US dollar= ksh 72.56, calculate to the nearest Kenya shillings the selling price of each toy. (3mks)

13. In the figure below ABC is a straight line in which AB=10cm and angle ABC=30˚. Line AD is perpendicular to BC and BD:DC=2:1.

Calculate to 1 decimal place the length of AC. (3mks)

14. Given that log3=0.4771 and log 5=0.6990 find without using mathematical tables the value of log 3375. (3mks)

15. The radius of a cylindrical container is increased by 40%. The capacity of the old container is 250cm3 . Find the capacity of the new container. (3mks)

16. Simplify 2√3+5√3 (2mks)

 **SECTION 2(50MKS)**

*Answer only five questions from this section*

17. A rectangular tree nursery measuring 16m by 14m is situated at the centre of a rectangular piece of land. A path of uniform width runs all round the tree nursery. The width of the path is x metres and the area of the piece of land is 360m2. The path is gravelled at a cost of sh 75 per square metre.

 a). Draw a rough sketch showing the tree nursery , the path and the field. (1mk)

b). Determine: (i) the value of x (4mks)

 (ii) the dimensions of the field. (2mks)

c). Calculate the cost of gravelling the path. (3mks)

18. Wanyonyi spent sh. 10500 to buy a number of shirts and a number of trousers from a wholesaler at sh 150 per shirt and sh 300 per trouser. Otieno bought the same number of shirts and trousers from another wholesaler where he paid 20% more for a shirt and 10% less for a trouser. Otieno spent sh 300 more than Wanyonyi.

a). Determine the number of shirts and trousers each man bought (4mks)

b). Wanyonyi sold all his clothes at a profit of 50% per shirt and 30% per trouser. How much profit did he make? (3mks)

c). Otieno sold all his clothes at a profit of 45% per shirt and 60% per trouser. Calculate the percentage profit he made on the sale of all his clothes. (3mks)

19. Four points A, B, C, D are situated on a horizontal plane such that B is 200m on a bearing of 065˚ from A. C is 300m on a bearing of 120˚ from B and D is 150m due west of C.

a). Draw a rough sketch showing the position of the four points (1mk)

b). Using a suitable scale draw an accurate scale drawing representing the positions A,B,C and D (5mks)

c). By measurement, use your scale drawing to find the distance and the bearing of

i) D from A (2mks)

ii) B from D (2mks)

20. A sector of a circle of radius 42cm subtends an angle of 120˚ at the centre of the circle

a). Calculate

 i) the area of the sector (2mks)

 ii) the length of the sector (2mks)

b) The sector is folded into an inverted right cone. Calculate

 i). the base radius of the cone (2mks)

 ii). To one decimal place, the vertical height of the cone (2mks)

iii). Determine to 2 decimal place the capacity of the cone in litres. (Take )

21. The mass of 40 students were measured to the nearest kilogram and recorded as shown below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 52 | 58 | 54 | 51 | 59 | 53 | 56 | 51 |
| 43 | 41 | 53 | 58 | 54 | 65 | 58 | 59 |
| 49 | 63 | 49 | 49 | 47 | 45 | 46 | 52 |
| 52 | 55 | 52 | 55 | 49 | 57 | 53 | 63 |
| 42 | 45 | 46 | 48 | 60 | 49 | 48 | 53 |

a). Use the data to complete the table below (4mks)

|  |  |  |  |
| --- | --- | --- | --- |
| Mass in kg | Class midpoint x | Frequency f | fx |
| 41-45 |   |  |   |
| 46-50 |  48 |  10 |  480 |
| 51-55 |  |   |  |
| 56-60 |  |  |  |
| 61-65 |  63 |  3 |  189 |
|  |  | Σf=40 | Σfx= |

b). Calculate

 (i) the mean mass. (2mks)

 (ii) the median mass. (2mks)

c). Draw a frequency polygon for the distribution (2mks)

22. The points P(1, 6), Q(2, 2), R(1, 1) and S(4, 2) are vertices of quadrilateral PQRS.

a). On a graph paper plot the points P, Q, R and S and hence draw quadrilateral PQRS. (2mks)

b). The points P’, Q’, R’ and S’ are the images of P, Q, R and S respectively under a rotation of +ve quarter turn about the origin. On the same grid draw quadrilateral P’Q’R’S’ and state the coordinates of its vertices. (3mks)

c). The points P’’, Q’’, R’’ and S’’ are the images of P’, Q’, R’ and S’ under a reflection in the x-axis. On the same grid draw a quadrilateral P’’, Q’’, R’’, S’’ and state the coordinates of its vertices. (3mks)

d). Quadrilateral P’’Q’’R’’S’’ is the image of PQRS under a certain reflection. On your graph draw the mirror line M for the reflection and state its equation. (2mks)

23. The figure below shows triangle OAB in which OA=**a** and OB**=b**. Points M and N are on OA and AB respectively such that OM=OA and AN=AB. Lines ON and BM meet at T such that OT=ON.

a). Express the following vectors in terms of **a** and **b**: (4mks)

 (i) AB (ii) BM (iii) ON

b). Given that BT=**k**BM, express vector BT in two different ways and hence find the value of **k.** (5mks)

c). Express vector TM in terms of **a** and **b**

**24.** The distance between Aoko’s house and Achieng’s house is 40km. One day Aoko left his house at 9:00am and cycled towards Achieng’s house at an average speed of 20km/h. Achieng left his house at 10.30 a.m on the same day and cycled towards Aoko’s house at an average speed of 30km/h.

a). Determine:

 (i) the distance from Aoko’s house where the two cyclists met (5mks)

 (ii) the time of the day when they met (2mks)

b). The two continued with their respective journeys until each reached her destination. Determine who reached her destination earlier and by how long. (3mks)

**GOOD LUCK,**

**(MATHEMATICS DEPARTMENT)**