**Name………………………………………………………. Adm No…………………………..**

 **Class……………………………….**

121/1

**Mathematics**

Paper 1

2 ½ Hours

JULY/AUG 2014

**BUSIA COUNTY JOINT EVALUATION TEST -2014**

**Kenya Certificate of Secondary Education ( K.C.S.E )**

## INSTRUCTIONS TO CANDIDATES

* Write your name and Admission number in the spaces provided at the top of this page.
* This paper consists of two sections: Section I and Section II.
* Answer ALL questions in section 1 and ONLY FIVE questions from section II
* All answers and workings must be written on the question paper in the spaces provided below each question.
* Show all the steps in your calculation, giving your answer at each stage in the spaces below each question.
* Non – Programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

**FOR EXAMINERS USE ONLY**

**SECTION I**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **TOTAL** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

 **SECTION II GRAND TOTAL**

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

**SECTION I ( 50 MARKS )**

**Answer ALL Questions in this Section**

1. Evaluate the following; **(3 marks)**

 

1. Use square roots, reciprocal and square tables to evaluate to 4 significant figures the expression; **( 4 marks)**
2. Solve for x in the equation **(3mks)**

4. The points A, B and C lie on a straight line. The position vectors of A and C are

2**i** + 3**j** + 9**k** and 5**i** – 3**j** + 4**k** respectively; B divides AC internally in the ration 2:1. Find

the

1. Position vector of B. **(2 marks)**

 (b) Distance of B from the origin. **(1 mark)**

1. Without using tables, evaluate giving the answer in standard form

**(3 marks)**

1. Evaluate  **(3 marks)**
2. Simplify   **(3 marks)**
3. What is the equation of the circle whose center lies on the line y - 2y + 2 = 0 and which touches the positive axes? **(3 Marks)**
4. Find the value of x in the equation  in the range listed below.

0o ≤ x ≤ 180o   **(3mks)**

10. A farmer has a piece of land measuring 840m by 396m. He divides it into square plots of equal size. Find the maximum area of one plot. **(3 marks)**

11. Give the equation of the normal to the curve y = x3 + 2x + 1 at (1, 4) **( 3 marks)**

12. The position of two towns P and Q are given as P(45oN, 10oW) and Q(45oN,170oE).Calculate the difference in distance (i) Through the North Pole and (ii) along the parallel of latitude in nautical miles.  **(3 marks)**

13. A liquid spray of mass 384g is packed in a cylindrical container of internal radius 3.2 cm. Given that the density of the liquid is 0.6g/cm3, calculate to 2dp the height of the liquid in the container. **(3 marks)**

1. (a) Find the inverse of the matrix **( 1 mark)**

(b) Hence solve the simultaneous equation using the matrix method **( 2 marks)**

 4x +3y = 6

 3x + 5y = 5

15. Find the percentage error in the total length of four rods measuring 12.5cm, 24.5cm, 12.9cm and 10.1cm all to the nearest 0.1cm. **(3 marks)**

16. The following data was obtained from the mass of a certain animal. Complete the table and the histogram below. **(3 marks)**

|  |  |
| --- | --- |
| Mass(kg) | frequency |
| 41-50 | 20 |
| 51-55 |  |
| 56-65 | 40 |



**SECTION II ( 50 MARKS )**

**Answer any Five Questions in this Section**

17. A businessman obtained a loan of Kshs.450,000 from a bank to buy a matatu valued at the same amount. The bank charges interest at 24% per annum compound quarterly:

(a) Calculate the total amount of money the businessman paid to clear the loan in 1½ years. **(4 marks)**

 (b) The average income realized from the matatu per day was Kshs.1500. The matatu

worked for 3 years at an average of 280 days per year. Calculate the total income from

the matatu. **(2 marks)**

 (c) During the three years, the value of the matatu depreciated at the rate of 16%per

annum. If the businessman sold the matatu at its new value, calculate the total profit he realized by the end of three years. **(4 marks)**

18. PQRS is a regular tetrahedron of side 4cm.

 

1. Calculate the angle between planes PSR and QRS **( 4 marks)**

1. Calculate the volume of the Tetrahedron **( 6 marks)**

19. (a) The first term of an Arithmetic Progression(AP) is 2. The sum of the first 8 terms of the

 AP is 156.

(i) Find the common difference of the AP. **(2 marks)**

 (ii) Given that the sum of the first *n* terms of the AP is 416, find *n*. **(2 marks)**

1. The third, fifth and eighth terms of another AP form the first three consecutive terms of a Geometric Progression (GP). If the common difference of the AP is 3, find
	1. The first term of the GP; **(4 marks)**
	2. The sum of the first 9 terms of the GP, to 4 significant figures. **(2 marks)**

20. Using a ruler and compasses only, construct a triangle ABC such that BC = 8cm, angle

 ABC = 600 and angle BAC = 450.

 (a) On the same diagram, measure the length of : **(5 marks)**

 (i) AC

 (ii) BC

 (b) Draw the circumcircle of the triangle ABC. **(2 marks)**

 (c) Construct the locus of a point P within the triangle by shading the unwanted region inside the circumcircle such that the following conditions are satisfied: **(3 marks)**

 (i) P is closer to A than B.

 (ii) Angle PAB angle PAC.

21. (i) By calculations show that y = x3 – 3x2 + 2x and y + 3 = 3x intersect at x = -1, 1 and 3 **(3 marks)**

1. Sketch the curve and the line on the same axis, hence calculate the area enclosed by the curve, lines x = 0 and y + 3 = 3x **(7 marks)**

22. In the figure below DA is a diameter of the circle ABCDE centre O. TCS is a tangent to the circle at C, AB = BC and angle DAC = 380

Giving reasons, determine the following angles:

(a) **(2 marks)**

(b) **(2 marks)**

(c) **(2 marks)**

(d) **(2 marks)**

(e) **(2 marks)**

23. The coordinates of a triangle ABC are A(1, 1) B(3, 1) and C (1, 3).

(a) Plot the triangle ABC. **(1 mark)**

(b) Triangle ABC undergoes a translation vector. Obtain the image of A' B' C ' under the transformation, write the coordinates of A' B' C'. **(2 marks)**

(c) A' B' C' undergoes a reflection along the line X = 0, obtain the coordinates and plot on the graph points A" B" C", under the transformation **(2 marks)**

(d) The triangle A" B" C" , undergoes an enlargement scale factor -1, centre origin. Obtain the coordinates of the image A'" B"' C"'. **(2 marks)**

(e) The triangle A"' B"' C"' undergoes a rotation centre (1, -2) angle 1200. Obtain the coordinates of the image Aiv Biv Civ. **(2 marks)**

(f) Which triangles are directly congruent. **(1 mark)**

**24.** A matatu and Nissan left town A for town B 240km away at 8.00a.m travelling at 90km/hr and 120km/hr respectively. After 20 minutes the Nissan had a puncture which took 30 minutes to mend.

 a) How far from town A did the Nissan catch up with the matatu? **(6 marks)**

 b) At what time did the Nissan catch up with the matatu? **(1 mark)**

 c) At what time did the matatu reach town B? **(3 marks)**