MATHEMATICS

**FORM TWO**

*End of Year Examinations*

*Third Term 2014*

TIME: 2$^{1}/\_{2}$HOURS

**NAME**……………………………………………….**ADM,NO**……………**CLASS**……..

DATE……………………………SIGN…………………………………………

**Instructions to candidates**

1. *Write your name, admission no. and class in the spaces provided.*
2. *The paper contains two sections; Section I and II.*
3. *Answer all questions in Section I and II*
4. *All answers and working must be written on the question paper in the spaces provided below each question.*
5. *No use of calculators*

**FOR EXAMINER’S USE ONLY**

**SECTION I**

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

**SECTION II**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 17 | 18 | 19 | 20 | 21 | **TOTAL** |
|  |  |  |  |  |  |

**SECTION I (50MARKS*) answer all the Questions***

1. A rectangle whose length is 7cm longer than its width has an area of 120$cm^{2}$.
2. Taking $x$ to represent the length of the rectangle, form a quadratic equation in $x$ for the area of the rectangle. (1Mark)
3. By factorizing solve the quadratic equation and hence state the dimensions of the rectangle. (2Marks)
4. You are given that cos$ ∂$=$\frac{8}{10}$ . Without using mathematical tables express in fraction form the value of
5. $sin∂$ (1Mark)
6. $\tan((90-∂))$ (2Marks)
7. The line which joins then points A(3,k) and B(-2,5) is parallel to the line whose equation is $\frac{5}{7}y+\frac{2}{7}x=1.$ Find the value of k (3Marks)
8. The wheel of a bicycle has a diameter of 70 cm and makes 2 revolutions per second. Calculate to one decimal place the speed of the bicycle in km/hr. (3Marks)
9. The coordinates of P and Q are (3, 6) and (-3, 2) respectively. Express them as position vectors. Find the position vector of the mid-point M of PQ (3Marks)
10. A cylindrical container of diameter 42cm and height 30cm is one-third full of water. The container is filled using a smaller cylindrical can of radius 4.2 cm and height 10cm. determine the number of full cans required to fill the container. (3Marks)
11. The figure shows a solid cone of base diameter of 14cm and vertical height of 10cm. Calculate to one decimal place
12. The slant height of the cone (1Mark)
13. The total surface area of the cone (2Marks)
14. Simplify (3Marks)

$$\frac{x-2}{x+2}-\frac{2x-4}{x^{2}-4}$$

1. The figure shows a circle centre O and radius 6cm. AOBC is a sector of the circle and AOB is a triangle in which angle AOB=$70^{0}$.

Calculate to 2 decimal places the area of the shaded region (Take π=$\frac{22}{7}$) (3Marks)

1. (a) Use mathematical tables to find
2. $\frac{1}{2.754}$ (2Marks)
3. $4.765^{2}$ (1Mark)
4. Hence or otherwise calculate to 3 significant figures the value of (2Marks)

$$4.765^{2}+\frac{1}{2.754}$$

1. Solve for $x$ in the equation (3Marks)

$25^{x}+5^{2x}$= 50

1. The marked price of some goods was sh. 480,000. A salesman sold these goods at a discount of 2$\frac{1}{2}$%. He received sh. 18 720 as commission on the sale. At what percentage rate of commission was he paid? (3Marks)

1. The base areas of two cylindrical containers are $135cm^{2}$ and $240cm^{2}$ respectively.
2. Determine the area scale factor and hence the linear scale factor. (2Marks)
3. If the capacity of the smaller container is$540cm^{3}$, what is the capacity of the larger container in litres? (2Marks)
4. Solve the equation (3Marks)

$$\frac{2}{3x}-\frac{1}{4}=\frac{5}{12x}$$

1. Three girls, Rose, Doris and Pauline together score 207 marks in a test. The Ratios of their marks were: Rose to Doris, 3 to 2 and Doris to Pauline 6 to 8. How many marks did each girl score? (3Marks)
2. Given that $x=3$ , $y=-2 $and $z=-1$, find the value of (2Marks)

$$\frac{4xyz-2xz^{2}-5y}{xy^{3}z+3xz^{3}+4y}$$

**SECTION II (50MARKS) *answer all the questions***

1. (a) The points A (2, 6) B (1, 1), C (3, 4) and D (5, 3) are vertices of a Quadrilateral ABCD. Plot the points A, B, C and D on the graph paper and join them to form a quadrilateral. (2Marks)
2. Locate and write down the coordinates of the points A’, B’, C’ and D’ The images of A,B,C and D respectively under rotation of positive $90^{0}$ about the origin. On the same grid draw the image of the quadrilateral A’B’C’D’. (3Marks)
3. Locate and write down the coordinates of the points A’’, B’’, C’’ and D’’ which are images of A’, B’, C’ and D’ respectively under reflection in the $x$- axis. On the same grid draw the second image quadrilateral A’’B’’C’’D’’. (3Marks)
4. Quadrilateral A’’B’’C’’D’’ is the image of ABCD under a reflection. On your graph mark the mirror line MM of this reflection and state its equation. (2Marks)
5. A country bus left town A at 11.45 a:m and travelled towards town B at an average speed of 60km/hr. A matatu left town B at 1.15pm on the same day and travelled towards town A along the same road at an average speed of 90km/hr. The distance between the two towns is 540km.

Determine

1. The time of day when the two vehicles met. (4Marks)
2. How far from town A they met (2Marks)
3. How far outside town B the bus was when the matatu reached town A (4Marks)
4. (a) Solve the following simultaneous inequalities
5. $\frac{1}{4}x+\frac{1}{3}\leq \frac{1}{3}x+\frac{1}{2}$ (3Marks)

 $\frac{ 1}{5}x-\frac{2}{5}\leq \frac{1}{6}x-\frac{1}{3}$

1. $3x-2\leq 6+5x$ (3Marks)

$$2x-3<15-4x$$

1. By drawing appropriate straight lines on graph paper and shading the unwanted regions for each line, illustrate the region which satisfies all the inequalities below (4Marks)
2. $4y-3x\leq 12$ (iii) $y\geq 3$
3. $6y+5x<60$ (iv) $x\geq 2$
4. A trader bought some eggs at sh. 64 per dozen and sold two-thirds of them at sh. 240 per tray and the other one-third at sh. 225 per tray. In so doing she made a profit of sh. 450. Given that one tray holds 30 eggs, determine
5. The number of eggs she bought. (4Marks)
6. The percentage profit she made giving your answer to one decimal place.(3Marks)
7. The percentage profit she would have made if she sold all the eggs at sh 240 per tray. (3Marks)
8. The masses of 40 students were measured to the nearest kilogram and recorded as shown

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Mass in kg | 41 – 45 | 46 – 50  | 51 – 55  | 56 – 60 | 61 – 65 |
| Frequency | 5 | 10 | 14 | 8 | 3 |

1. Modify this table to calculate the mean mass (6Marks)
2. Draw a frequency polygon for the distribution (4Marks)