

PANGANI GIRLS SCHOOL
PRE-MOCK EXAMINATION
MATHEMATICS DEPARTMENT
FORM 4 – MARCH 2013

PAPER 1

TIME : $2 \frac{1}{2}$ hours

NAME.....

CLASS

INDEX NUMBER

CLASS NUMBER.....

Instructions to candidates

- 1) Write your name, index ,and class number in the spaces provided above.
- 2) The paper consists of two sections: **section I** and **section II**.
- 3) Answer **all** the questions in **section I** and any **five** in **section II**
- 4) Section I has **sixteen** questions and section two has **eight** questions
- 5) All answers and working must be written on the question paper in the spaces provided below each question.
- 6) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- 7) KNEC Mathematical table and silent non-programmable calculators may be used.

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	22	23	24	total

Grand
Total

This paper consist of 15 printed copies candidates should check the question paper to ensure that all pages are printed as indicated and no question is missing.

SECTION 1 (50 marks)

Answer all the questions in this section in the spaces provided

- 1) Without using logarithms or a calculator evaluate
2marks

$$\frac{0.015 + 0.45 \div 1.5}{4.9 \times 0.2 + 0.07}$$

- 2) A room whose measurements are 4.50m and 5.25m is to be carpeted by square tiles. Find the minimum number of square tiles needed to completely cover the room.
3marks

- 3) Simplify without using a calculator.
3marks

$$\frac{\frac{3}{4} + 1\frac{5}{7} \div \frac{4}{7} \text{ of } 2\frac{1}{3}}{\left(\frac{2}{5} - \frac{5}{8}\right) \times \frac{2}{3}}$$

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- 4) The distance between estate A and B is 9Km. Atieno and Wambui left town A for B. Atieno cycled at 2Km/h faster than Wambui arrived at B one hour twelve minutes earlier than Wambui .Calculate there speeds, 4marks

- 5) Use four figure reciprocal and square root tables only to find the value of P if 3marks

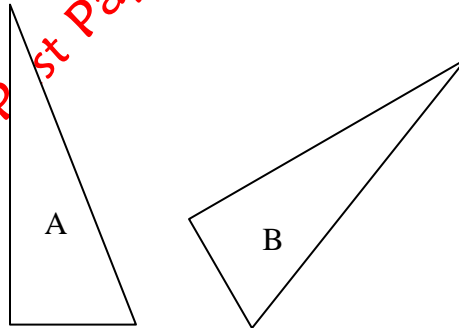
$$\frac{1}{p^2} = \frac{2}{0.18} + \frac{17}{187}$$

- 6) What is the density of an alloy made by mixing 51g of metal A with a density of 17g/cm³ with 15g of metal B with a density of 3g/cm³ 3marks

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- 7) A man left $\frac{1}{5}$ of his estate to his wife and $\frac{2}{3}$ of the remainder to be divided equally to each of his two sons. The rest was to be shared in the same ratio among his six cousins. If each cousin got sh 60 000 how much money did the son get? 4marks

- 8) In the figure below A is the image of triangle B under a certain rotation find the center and angle of rotation 3marks



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9) Use mathematical tables to evaluate

4marks

$$\left(\frac{0.4321 \times 0.07622}{\log \tan 60^\circ} \right)^{0.2}$$

10) Find the number of sides for a regular polygon given that the value of exterior angle is 2 less than the number of sides.

3marks

11) From a viewing tower 15m above the ground the angle of depression of an object on the ground is 30° and the angle of elevation of an aircraft vertically above the object is 42° find the height of the aircraft above the object.

4marks

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12) Simplify by factorization

3marks

$$\frac{4b(a-b) - (6a+2b)(b-a)}{2a^2 - 2b^2}$$

- 13) A line L_1 passes through the points $(4, 8)$ and $(2, 0)$. Another line L_2 is perpendicular to L_1 and meets it at the x -intercept. Find by calculation the equation of L_2

3marks

- 14) Find the integral values of x which satisfy the inequality : $8 \geq 4 - 3x > -3$

2marks

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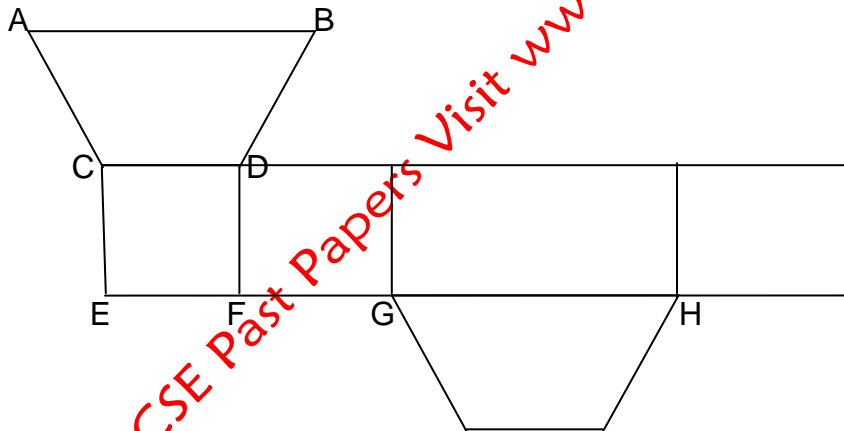
15) Solve the equation for x without using tables or a calculator :

3marks

$$\left(\frac{9}{5}\right)^x \times 3^{2-2x} - 1^x = 1124$$

16) The figure below (NOT DRAWN TO SCALE) shows a net of a prism where. All the measurements are in centimeters. Sketch the prism showing all the lines and vertices

3marks



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SECTION II (50 marks)

Answer **only five** questions in this section in the spaces provided

17) A bus left town P at 11.45 a.m and travelled towards town Q at an average speed of 60km/h. A van left town Q at 1.15p.m on the same day and travelled towards town P along the same road at an average speed of 90km/h. They met at 4.15pm. Determine,

I. the distance between the two towns 2marks

II. The distance from town P they met 1marks

III. The distance of the bus from town Q when the van reached town P. 3marks

IV. After reaching their destination they both rested for one hour before starting the return journey. At what time did they meet the second time. 4marks

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18) Kiriku is standing 16 km south of point P. She then walks on a straight path on a bearing of 030° . Calculate

I. a. How far will she have walked before she is equidistant from her starting point and P 2marks

b. The bearing of P from that point? 1marks

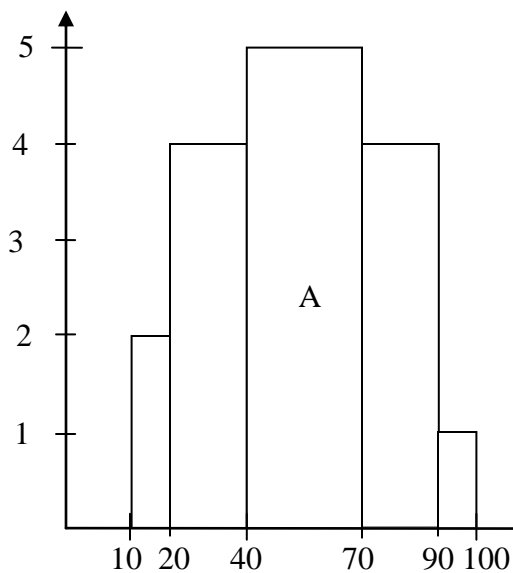
II. a. How far will she have walked before she is at the shortest distance from P 2marks

b. The bearing of P from that point 1mark

III. How far she will be from point P when she has walked 30km on the same straight path 4marks

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19) The histogram shows marks obtained by students in an examination



I. From the histogram make a frequency distribution table if the frequency of bar A is 15 3marks

II. Determine the modal class 1mark

III. Calculate the mean 3marks

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IV. Draw a frequency polygon to represent the above data 3marks

20) The transformation T_1 and T_2 are represented by the matrix

$$T_1 = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} \quad \text{and} \quad T_2 = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$$

I. A single transformation T can replace transformation T_1 followed by T_2 .
Write down the matrix for T 3marks

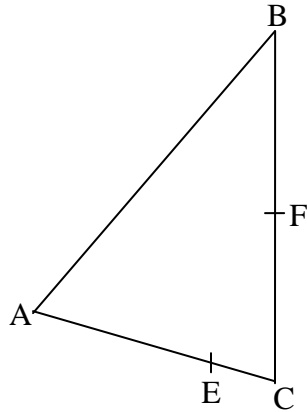
II. The points $A_2B_2C_2$ are the images of $A(3, 3)$, $B(1, 1)$, $C(0, 4)$ under T . Write down the co-ordinates of $A_2B_2C_2$. 3marks

III. On the axis plot triangle ABC and $A_2B_2C_2$. 2mark

IV. Describe the transformation T_1 and T_2 2marks

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21) A (1, 2), B (5, 6), C (5, -2) are vertices of a triangle. F is the midpoint of BC and $AE = 3EC$. A point G divides the line AB in the ratio 3 : -1.



I. Calculate the co-ordinates of

F

1mark

E

2marks

G

2marks

II. a. Find the column vector

EF

1mark

FG

1mark

b. Hence show that E, F and G are collinear

2mark

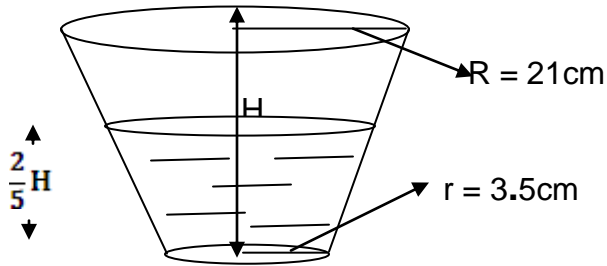
III. Write down the ratio of **EG : GF**

1mark

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22) The figure below shows a water container in the form of a frustum whose base radius is 3.5cm and top radius is 21cm. When the height of water in the container is two fifth up the container the volume of water in the container is 3 003 cm³.

(take $\pi = \frac{22}{7}$)



Calculate

I. The value of H

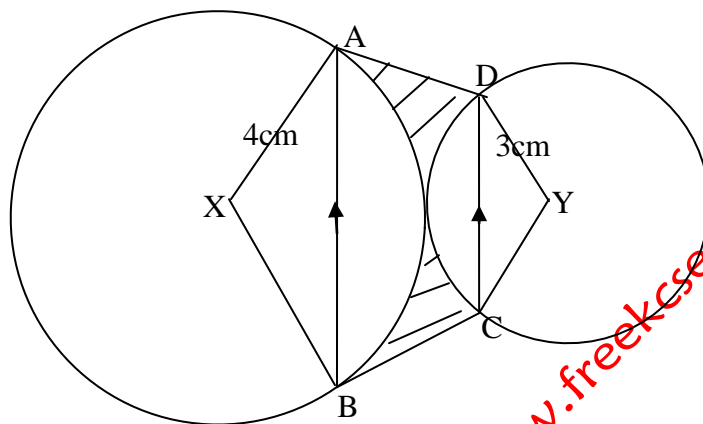
7marks

II. capacity of the container,

The
3marks

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23) The figure below shows two circles in contact with one another of radius 4cm and 3cm respectively. ABCD is a trapezium where AB is parallel to CD. X and Y are centers of the two circles. Angle AXB = 120° and $CYD = 96^\circ$



I. Calculate the length of
a. AB

1mark

b. DC

1mark

II. Calculate the
a. perpendicular height of the trapezium

3marks

b. area of the trapezium

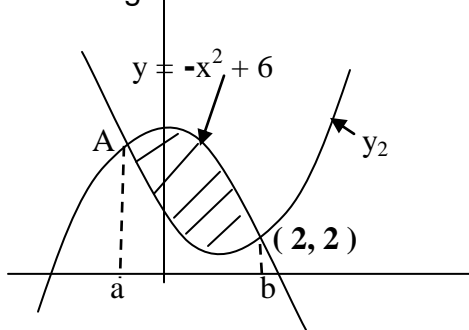
1mark

III. Find the area of the shaded part

4marks

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24) The diagram below shows the sketch of the curve $y = -x^2 + 6$ and another curve y_2 whose gradient function is $\frac{dy}{dx} = 2x - 3$ intersecting at A and $(2, 2)$.



I. Find the equation of the curve y_2 2marks

II. Calculate the co-ordinates of A 2marks

Hence write down the values of a and b 1mark

III. Find the area enclosed by the curve y_2 , the line $x = a$, line $x = b$ and the y axis 2marks

IV. Find the area of the shaded region 3marks

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