121/1
MATHEMATICS
PAPER 1
2½ HRS

BAHATI GIRLS HIGH SCHOOL
TRIAL EXAM

INSTRUCTIONS TO CANDIDATES

1. Write your name and Index Number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. The paper contains TWO sections 1 and 11.
4. Answer ALL the questions in Sections 1 and any five in section 11.
5. Answers and working must be written on the question paper in the spaces provided below each question.
6. Show all the steps in your calculation, giving your answers at each stage in the spaces below each question.
7. Non-programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

For Examiner's only

Section 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

Section 11

17	18	19	20	21	22	23	24	Total

Grand Total [ ]

The paper consists of 8 printed pages.
Candidates should check to see that no page is missing.

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1. Evaluate

$$\frac{16 \div 2 \text{ of } (-4) \times 6 + 283}{-2 \div 5 \times 2}$$

(3mks)

2. Simplify the expression. $\left(x + \dfrac{1}{y}\right)^2 - \left(x - \dfrac{1}{y}\right)^2$ (3mks)

3. A diesel generator was bought at sh. 21,600. At the end of the first year of use its value depreciated by 25%. The depreciation at the end of second year is 20% and thereafter the rate of depreciation is 15% yearly. Calculate the exact value of the diesel generator at the end of the fifth year. (3mks)

4. The position vectors of **A** and **B** are **A**=$2i + j$-$3k$ and **B** = $3i + 2j$ - $2k$ respectively. Find AB. (2mks)

5. Solve the following inequalities and represent the solutions on a single number line. (3mks)

$$3 - 2x < 5, \; 4 - 3x \geq -8$$

6. If $x = \dfrac{2}{3}$ is a root of $6x^2 + kx - 2 = 0$. Find the value of k and the other root. (4mks)

7. Without using mathematical tables or calculator, evaluate:- (2mks)

$$\sqrt{\left(\frac{0.0625 \times 2.56 \times 8^{\frac{1}{3}}}{0.25 \times 0.16 \times 0.5}\right)}$$

8. A line segment PQ with coordinates (0,2) and (1,1) is mapped onto P'Q' with coordinate (4,6) and (7,3) respectively by an enlargement. Calculate the scale factor and the coordinates of the center of this enlargement. (4mks)

9. A two digit number is 27 less than the number formed by reversing the digits. If the sum of the digits is 15. Find the number. (4mks)

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10. The mean of a set of **n** numbers is 28. If an extra number 18 is included in the set, the mean now becomes 26. Find the value of **n**. (3mks)

11. Calculate angle ABC in the figure below given that AD= 3.63m, BD = 2..76m, angle A = 41.8^0 angle C=30^0 (4mks)
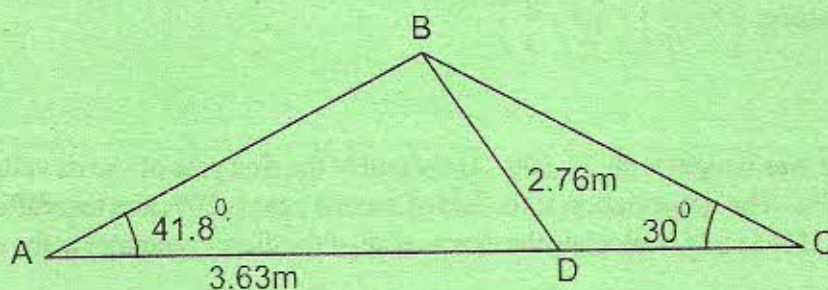
12. O is the centre of the circle and EFGH is a parallelogram. EH=FH and angle EOH = 100^0. Find angle EFG. (2mks)
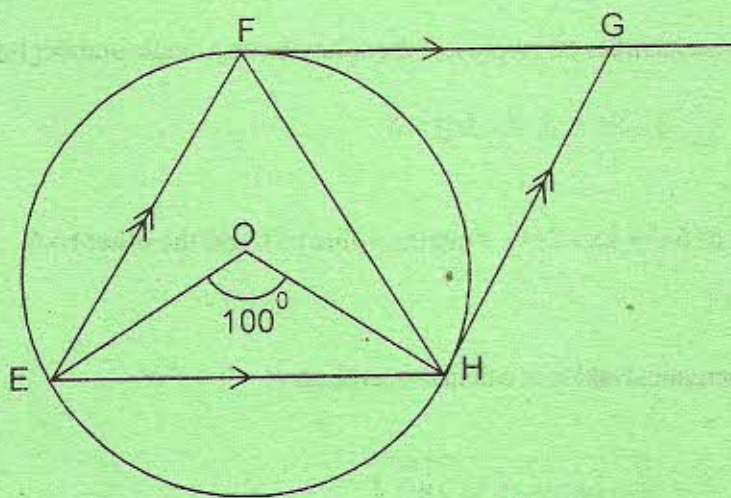
13. Use reciprocal and square root tables to evaluate, to 4 significant figures, the expression. (3mks)

$$\frac{5}{0.04796} + \sqrt{583.6}$$

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14. During a certain period the exchange rate at Petamax Exchange Bureau were as follows.

	Buying (Ksh)	Selling (Ksh)
Deutchmark (DM)	19.68	19.74

A tourist arrived in Kenya with 5840 Deutchmark which he changed into Kshs. He spent $\frac{2}{3}$ of the money touring various sites and changes the balance to DM. Calculate his balance giving your answer to 4 s.f.   (4mks)

15. The exterior angle of a regular polygon is equal to one third of the interior angle. Calculate the number of sides of the polygon and give its name.   (4mks)

16. Solve the equation $\dfrac{x+1}{2} = 1 - \dfrac{1-3x}{5}$.   (2mks)

17. The positions of two towns on the surface of the earth are given as P(30⁰S, 20⁰W) and Q(30⁰S, 80⁰E). Find:-
    a) The difference in longitude.   (2mks)
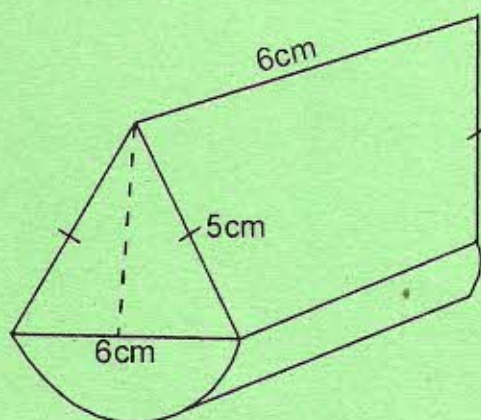
    b) The distance between the two towns along a parallel of latitude in:-

       (i) Km (take the radius of the earth as 6370km and $\pi = \frac{22}{7}$.   (3mks)

       (ii) nm.   (2mks)

    c) Find the local time in town Q when it is 1.45pm in town P.   (3mks)

18. a) Sketch the net of the solid below.   (2mks)

    b) Using the above sketch, calculate the surface area of the solid.   (5mks)

    c) Calculate the volume of the solid above.   (3mks)

19. a) On the grid provided draw triangle A(1,1)B(4,1) C(4,4).   (1mk)

    b) Draw A¹B¹C¹ the image of ΔABC after a rotation of 90⁰ anti clockwise about (0,0), state the co-ordinates of A¹B¹C¹.   (3mks)

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c) A²B²C² is the image of A¹B¹C¹ after reflection in the x-axis. Draw ΔA²B²C² and state the coordinates of the vertices. (3mks)

d) ΔA³B³C³ is the image of Δ A²B²C² after reflection in the line x=1. Draw Δ A³B³C³ and state the coordinates of the vertices. (3mks)

20. The distance between two towns A and B is 460km. A minibus left town A at 8.45a.m and travelled towards B at an average speed of 65km/h. A matatu left B at 10.55a.m on the same day and travelled towards A at an average speed of 80km/h.

a) How far from town B did they meet. (4mks)

b) At what time did the two vehicles meet? (2mks)

c) A motorist started from his home at 9.15a.m on the same day and travelled to B at an averaged speed of 120km/h. He arrived at the same time as the minibus. Calculate the distance from B to his home. (4mks)

21. Two circles of radii 3.5cm and 4.2cm with centres x and y respectively intersect at point A and B as shown below.
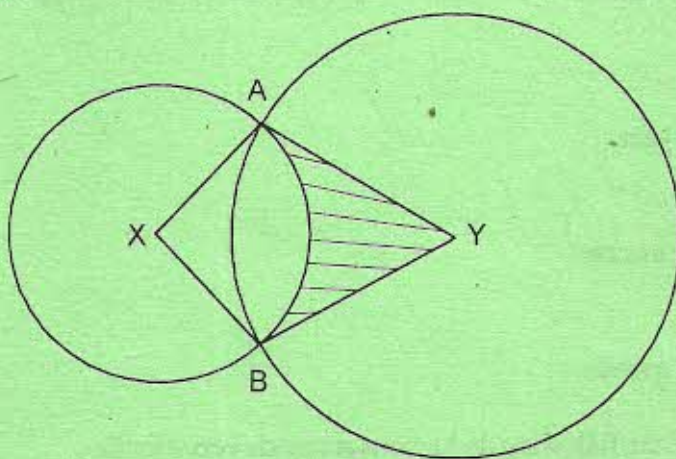
Given that the centres of the circles are 6cm apart, find
a) Angle AXB. (3mks)

b) Angle AYB. (3mks)

c)   The area of the quadrilateral XAYB correct to 3d.p.   (2mks)

d)   The shaded area correct to 2 significant figures. Take $\pi = \frac{22}{7}$.   (2mks)

22.   The table below shows the rates of taxation in a certain year.

Income tax in K£ a	Rate in Ksh per K £
1 – 4000	2
4001 – 7500	3
7501 – 11000	4
11001 – 14500	5
14501 – 18000	8
18001 – 21500	9
Over 21500	10

Mr. John is a primary school teacher. In a ceratin month his PAYE was Ksh. 7694. However John has the following allowances: Hardship allowance 30% of his basic salary, house allowance Ksh. 6000 per month and medical allowance 1700 per month. John is entitled to a family relief of Ksh. 1056 per month.

Work out:-
a)   John's total tax per year.   (2mks)

b)   His monthly taxable income.   (4mks)

c)   His basic salary per month.   (2mks)

d)   In addition to PAYE the following deductions are made very month:-
      - Co-operative shares Ksh. 1000
      - WCPS 2% of the basic salary

Calculate his net pay per month.   (2mks)

23. Four towns R,T,K and G are such that T is 84km directly to the north of R, and K is on a bearing of 295⁰ from R at a distance of 60km. G is on a bearing of 340⁰ from K and at a distance of 30km. Using a scale of 1cm to represent 10km, make an accurate scale drawing to show the relative positions of the towns. (4mks)

Find:-

a) The distance and bearing of T from K. (2mks)

b) The distance and bearing of G from T. (2mks)

c) The bearing of R from G and the distance between them. (2mks)

24. A cylindrical storage tank of diameter 14cm is initially two thirds full of water. The tank is filled by pipe of internal radius 5cm through which water flows at the rate of 56litres per minute. Water starts flowing into the tank at 10.15am and the tank is full at 2.55 p.m.

a) Determine the height of the tank. (5mks)

b) Starting with the full tank, school uses water from this tank at the rate of 11,550 litres per day. Find how long it takes to consume all the water assuming that no more water is added. (3mks)

c) How long does it take for the tap to fill the tank when empty? (2mks)