

Name Class.....

FORM 2

END-YEAR EXAMINATION 2017

2½ Hours

Instructions to candidates

- Write your name and class in the spaces provided above.
- The paper contains two sections, section A and B.
- Answer **ALL** the questions in **Section A** and any **five** questions from **Section B**
- All answers and working must be written on the question paper in the spaces provided below each question.
- **Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.**
- Marks may be given for correct working even if the answer is wrong.
- Mathematical tables may be used.
- Electronic calculators **MUST NOT** be used.

For Examiner’s use only.

Section A

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

Section B

17	18	19	20	21	22	Total

Grand Total

This paper consists of 13 printed pages
 Candidates should check the question paper to ascertain
 that all the pages are printed as indicated and no questions are missing
SECTION A: (50 MARKS)

Answer ALL questions in this section

1. Factorise completely (2marks)
 $5a^2+ab-4b^2$

2. Without using a calculator evaluate

(3marks)

$$\frac{14 \div \frac{1}{3} \text{ of } 5\frac{1}{4} - 3\frac{3}{4} \times 1\frac{1}{3}}{\frac{3}{5} \times 6\frac{1}{4} + 1\frac{1}{2}}$$

3. Use logarithms to evaluate:

(4marks)

$$\sqrt{\frac{(0.8524)^3 \times 24.86}{99.28 - 15.53}}$$

4. Find the value of x in the equation

(3mks)

$$9^x + 3^{2x+1} = 36$$

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5. Given that $\tan x = \frac{5}{12}$ find without using mathematical tables or calculator the value of
(i) $\sin x$ (2 marks)

(ii) $\cos(90-x)$ (2 marks)

6. The length and width of a rectangle are 24cm and 15cm respectively. Each dimension of the rectangle is increased in the ratio 4:3

a) Find the dimensions of the rectangle. (1 mark)

b) Calculate the percentage increase in the perimeter of the rectangle (2 marks)

7. A cylindrical Can has a diameter of 6cm while a larger similar Can has a diameter of 15cm

(a) determine

i) The liner scale factor (1 mark)

ii) The volume scale factor (1 mark)

b) Calculate the capacity of the smaller can given that the capacity of the larger can is 5.625L (2 marks)

8. Twenty four men take 14 days to dig 8 hectares of land. How many more men will be required to dig 10 hectares in 12 days? (2 marks)

9. The interior angle of a regular polygon is 3 times the exterior angle. Find the exterior angle and hence the number of sides of the polygon. (3 marks)

10. The width of a rectangle is $(3x-1)$ cm. Its length is 4cm longer than the width. Given that the area of the rectangle is 96cm^2 Find its length. (3 marks)

11. Three similar 21 inch television sets and five similar 17 inch television cost Ksh.129,250. The difference between the cost of two 21 inch television sets and four 17 inch television sets is Ksh.22,000. Calculate the price of a 21- inch television set and that of 17-inch television set. (3 marks)

12. On a certain day a bank exchanged currencies at the rate given in the table below.

Currency	Euro	US dollar	UK£
Buying (Ksh)	102.90	77.65	116.40
Selling (Ksh)	103.85	78.20	117.75

Emmanuel exchanged 400 Euros and 580 us dollars into Kenyan shillings and used the money to buy 600 UK£. Calculate the amount of money in Kenyan shillings remained (3 marks)

13. Find the integral values of x which satisfies the inequalities $2x-1 < 7 + x \leq 3x+1$ (3 marks)

14. Without using mathematical tables evaluate the following giving your answer in surd form. (3 marks)

$$\frac{\sin 45^\circ + \cos 30^\circ}{\tan 60^\circ}$$

15. Use reciprocal tables to evaluate (3 marks)

$$\frac{3}{0.04516} - \frac{7}{24.83}$$

16. The table below gives masses of 44 students measured to the nearest kilograms.

Masses (kg)	Frequency
35-39	4
40-44	11
45-49	16
50-54	10
55-59	3

- (a) State the modal class (1 mark)

(b) Calculate the median mass to 2 decimal places

(3 marks)

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SECTION B(50 MARKS)

Answer any five questions in this section

17. Town B is 300km on a bearing of 060° from town A. The same town B is also on a bearing of 330° from town C, 250km away.

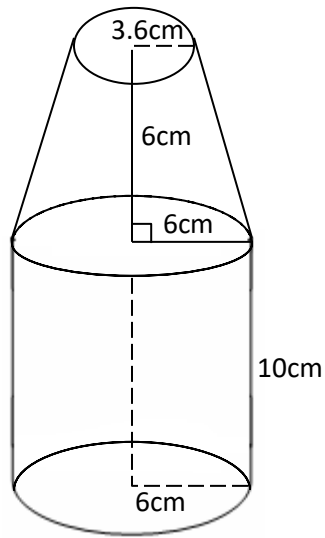
- a) Using a scale of 1cm to 50km make an accurate scale drawing to represent the positions of the three towns. (4 marks)

(a) Measure the bearing of town C from town A. (2 marks)

(b) Find the distance of town C from town A. (2 marks)

(c) What is the bearing of C from town B. (2 marks)

18. A right conical frustum of base radius 6cm is mounted on top of a cylinder of the same base radius and height 10cm. The top of the solid frustum is of radius 3.6cm. The height of frustum is also 6cm. Take $\pi = \frac{22}{7}$.



Calculate:

(a) The total surface area of the solid.

(6 marks)

(b) The volume of the solid.

(4 marks)

19. A school bus left Nairobi at 9:00am and traveled towards Eldoret at an average speed of 80km/hr. At 9.30a.m a car left Eldoret towards Nairobi at an average speed of 120km/h. Given that the distance between Nairobi and Eldoret is 400km. Calculate

(a) The time the car arrived in Nairobi

(2 marks)

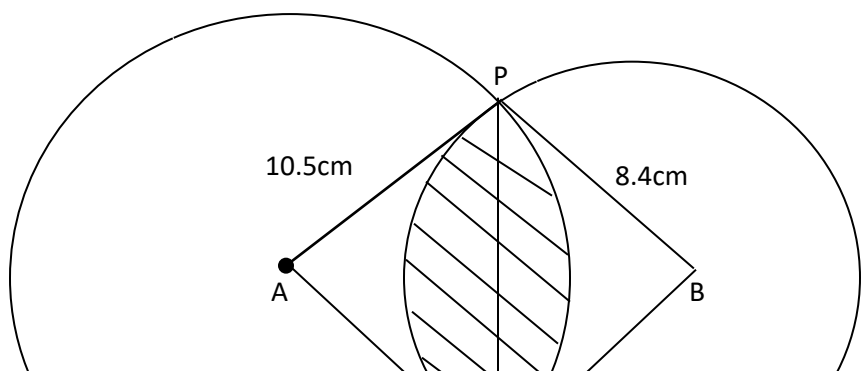
(b) The time the two vehicles met (4 marks)

(c) The distance from Nairobi to the meeting point (2 marks)

(d) The distance of the bus from Eldoret when the car arrived in Nairobi (2 marks)

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20. The figure **below** shows two circles of radii 10.5 and 8.4cm and with centres A and B respectively. The common chord PQ = 9cm.



(a) Calculate angle PAQ. (2 marks)

(b) Calculate angle PBQ. (2 marks)

(c) Calculate the area of the shaded part. (6 marks)

21. The vertices of triangle PQR are P(0,0), Q(6, 0) and R(2, 4)

(a) Draw triangle PQR on the grid provided. (1 mark)

(b) Triangle $P^1Q^1R^1$ is the image of a triangle PQR under an enlargement scale factor $\frac{1}{2}$ and centre (2, 2). Write down the coordinates of triangle $P^1Q^1R^1$ and plot on the same grid. (2 marks)

(c) Draw triangle $P^{11}Q^{11}R^{11}$ the image of triangle $P^1Q^1R^1$ under a positive quarter turn about points (1, 1). (3 marks)

- (d) Draw a triangle $P^{111}Q^{111}R^{111}$ the image of triangle $P^{11}Q^{11}R^{11}$ under reflection in the line $y = 1$.
(2 marks)
- (e) Describe fully a single transformation triangle $P^{111}Q^{111}R^{111}$ onto triangle $P^1Q^1R^1$.
(2 marks)

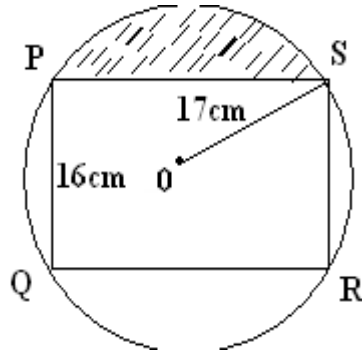
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22. Find the equation of a straight line passing through the points (3, 2) and (-3, 6) giving your answer in the form ,

$\frac{x}{a} + \frac{y}{b} = 1$ where a and b are constants. (4 marks)

- b) State the coordinates of point A and B, at which the line in (a) above crosses the x-axis and y-axis respectively. (2 marks)
- c) Using the information in (a) and (b) above, find the area of triangle AOB, where O is the origin. (2 marks)
- d) Find the acute angle the line in (a) above makes with the x-axis. (2 marks)

23. The figure below represents a rectangle PQRS inscribed in a circle centre O and radius 17cm. PQ = 16cm.



Calculate

- (a) The length PS of the rectangle

(2 marks)

- (b) The angle POS

(4 marks)

- (c) The area of the shaded region

(4 marks)

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- 24(a) Without using a protractor or set square, construct a triangle ABC in which $AB = 4\text{cm}$, $BC = 6\text{cm}$ and $\angle ABC = 67\frac{1}{2}^\circ$. Take AB as the base. (Use a graph in this question) (3 marks)
Measure AC
- b) Draw a triangle $A^1 B^1 C^1$ which is indirectly congruent to triangle ABC. (3 marks)
- c) Taking the mid point of AB as your centre of rotation (M). Find the triangle $A^{11}B^{11}C^{11}$ the image of $A^1 B^1 C^1$ after -90° . (4 marks)

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