MATHEMATICS PAPER 2 K.C.S.E 1995 QUESTIONS
SECTION 1 (52 MARKS)

1. Use logarithms to evaluate $\frac{(0.07284)^2}{\sqrt[3]{0.06195}}$ (4 marks)

2. Solve the simultaneous equations (4 marks)

$$2x - y = 3$$
$$X^2 - xy = -4$$

3. The tables shows the yearly percentage taxations rates.

Year	1987	1988	1989	1990	1991	1992	1993	1994
Percentage taxation rate	65	50	50	45	45	45	40	40

Calculate three- yearly moving averages for the data giving answers to s.f

(3 marks)

4. Calculate volume of a prism whose length is 25cm and whose cross- section is an equilateral triangles of 3 cm

5. Find the value of x in the following equations:

$$49^{x+1} + 7^{2x} = 350$$ (4 marks)

6. A translation maps a point (1, 2) onto) (-2, 2). What would be the coordinates of the object whose image is (-3 , -) under the same translation?

7. The ratio of the lengths of the corresponding sides of two similar rectangular water tanks is 3:5. The volume of the smaller tank is 8.1 m^3. Calculate the volume of the larger tank. (3 marks)

8. Simplify completely

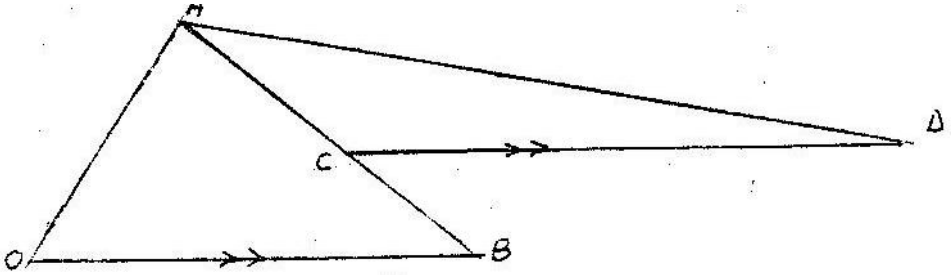
$$\frac{3x^2 - 1}{X^2 - 1} - \frac{2x + 1}{x + 1}$$

9. A boat moves 27 km/h in still water. It is to move from point A to a point B which is directly east of A. If the river flows from south to North at 9 km/ h, calculate the track of the boat.

10. The second and fifth terms of a geometric progressions are 16 and 2 respectively. Determine the common ratio and the first term

11. In the figure below CP= CQ and <CQP = 160^0. If ABCD is a cyclic quadrilateral, find < BAD.

12. In the figure below, OA = 3i + 3J ABD OB = 8i –j, C is a point on AB such that AC: CB = 3:2, and D is a point such that OB // CD and 2 OB = CD.



Determine the vector DA in terms of i and j. (4 marks)

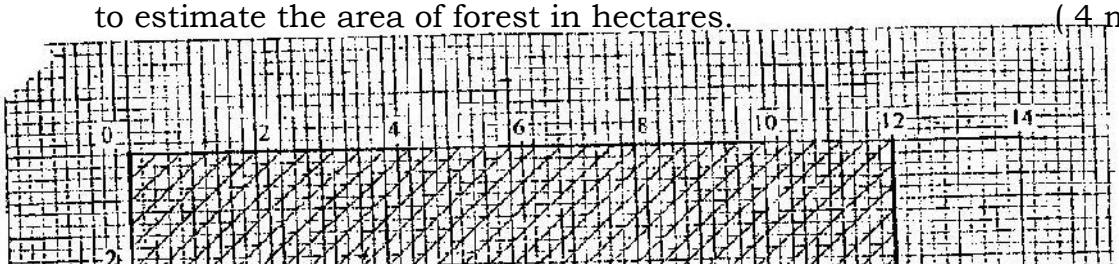
13. Without using logarithm tables, find the value of x in the equation

$$\text{Log } x^3 + \log 5x = 5 \log 2 - \log \frac{2}{5}$$ (3 marks)

14. Two containers, one cylindrical and one spherical, have the same volume. The height of the cylindrical container is 50 cm and its radius is 11 cm. Find the radius of the spherical container. (2 marks)

15. Two variables P and L are such that P varies partly as L and partly as the square root of L.
Determine the relationship between P and L when L = 16, P = 500 and when L = 25, P = 800. (5 marks)

16. The shaded region below represents a forest. The region has been drawn to scale where 1 cm represents 5 km. Use the mid – ordinate rule with six strips to estimate the area of forest in hectares. (4 marks)



SECTION II (48 Marks)
Answer any six questions from this section

17. A circular path of width 14 metres surrounds a field of diameter 70 metres. The path is to be carpeted and the field is to have a concrete slab with an exception of four rectangular holes each measuring 4 metres by 3 metres. A contractor estimated the cost of carpeting the path at Kshs. 300 per square metre and the cost of putting the concrete slab at Kshs 400 per square metre. He then made a quotation which was 15% more than the total estimate. After completing the job, he realized that 20% of the quotation was not spent.
(a) How much money was not spent?
(b) What was the actual cost of the contract?

18. The table below shows high altitude wind speeds recorded at a weather station in a period of 100 days.

Wind speed (knots)	0 - 19	20 - 39	40 - 59	60- 79	80- 99	100- 119	120- 139	140- 159	160- 179
Frequency (days)	9	19	22	18	13	11	5	2	1

(a) On the grid provided draw a cumulative frequency graph for the data (4 marks)

(b) Use the graph to estimate
(i) The interquartile range (3 marks)
(ii) The number of days when the wind speed exceeded 125 knots (1 mark)

19. The probabilities that a husband and wife will be alive 25 years from now are 0.7 and 0.9 respectively.
Find the probability that in 25 years time,

(a) Both will be alive
(b) Neither will be alive
(c) One will be alive
(d) At least one will be alive

20. A hillside is in the form of a plane inclined at an angle of 30^0 to the horizontal. A straight section of road 800 metres long lies along the line of greatest slope from a point A to a point B further up the hillside.

(a) If a vehicle moves from A and B, what vertical height does it rise?
(b) D is another point on the hillside and is on the same height as B. Another height straight road joins and D and makes an angle of 60^0 with AB. C is a point on AD such that AC = ¾ AD.
Calculate

(i) The length of the road from A to C
(ii) The distance of CB
(iii) The angle elevation of B and C

21. A part B is on a bearing of 080^0 from a port A and at a distance of 95 km. A submarine is stationed at a port D, which is on a bearing of 200^0 from AM and a distance of 124 km from B.
A ship leaves B and moves directly southwards to an island P, which is on a bearing of 140 from A. The submarine at D on realizing that the ship was heading fro the island P, decides to head straight for the island to intercept the ship
Using a scale 0f 1 cm to represent 10 km, make a scale drawing showing the relative positions of A, B, D, P. (2 marks)
Hence find
(i) The distance from A to D (2 marks)
(ii) The bearing of the submarine from the ship was setting off from B (1mark)
(iii) The bearing of the island P from D (1 mark)
(iv) The distance the submarine had to cover to reach the island P (2 marks)

22. Using ruler and compasses only, construct a parallelogram ABCD such that AB = 10cm, BC = 7cm and < ABC = 105^0. Also construct the loci of P and Q within the parallel such that AP ≤ 4 cm, and BC ≤ 6 cm. Calculate the area within the parallelogram and outside the regions bounded by the loci.

23. (a) Complete the table for the function y = 2 sin x (2 marks)

x	0^0	10^0	20^0	30^0	40^0	50^0	60^0	70^0	80^0	90^0	100^0	110^0	120^0
Sin 3x	0	0.5000											
y	0	1.00											