FORM FOUR CLUSTER KCSE MODEL10

MATHEMATICS PAPER 2 QUESTIONS

SECTION I (50 Marks)

(Answer all the questions in this section.)

1. Without using logarithm tables or calculator solve

$$Log5 - 2 + Log(2x + 10) = Log(x - 4)$$

2. Make p the subject of the formula

$$\frac{y}{r} = \frac{a}{pn} + \frac{b}{ap}$$

3. Find the percentage error in estimating the volume of a cone whose radius is 3.2cm and height is 8cm.

4. Find the equation of a circle whose centre is $\left(\frac{1}{2}, \frac{-2}{3}\right)$ and radius is 3 units leaving your answer in the form $ax^2 + by^2 + cx + dy + c = 0$ where a, b, c, d and e are integers. (3marks)

5. Water and milk are mixed such that the ratio of the volume of water to that of milk is 3 : 2. Taking the density of water as 1g /cm3 and that of milk as 1.2g /cm3, find the mass in grams of 2.5 litres of the mixture.
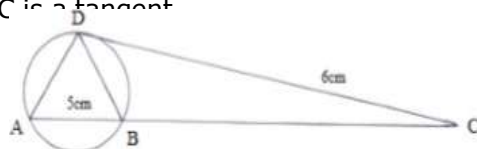
6. Solve $5Sin^2x + Sinx - 4 = 0$ hence find Tan x and Cos x if x is an obtuse angle.

7. Expand $\left(1 - \frac{1}{2}x\right)^6$ up to the term in x3, hence use your expansion to evaluate $(0.95)^6$

8. In the figure below, DC =6cm AB = 5cm. Determine BC if DC is a tangent.

9. Find the values of x for which $\begin{pmatrix} 3x & 4 \\ 9x & 6x \end{pmatrix}$ is a singular matrix.

10. Simplify $\frac{2}{2-\sqrt{3}} - \frac{3}{3-\sqrt{3}}$ leaving your answer in the form of $a + b\sqrt{c}$

11. Evaluate using logarithm tables.

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$$\left[\frac{Log\ 8293}{0.456\ \tan 81.2^0} \right]^{\frac{2}{3}}$$

12. The starting salary of Nasirembe per annum is £ 8040, His salary increased at the end of each year by 12%. Determine his earning per month during the 7th year.

13. The variable R varies partly as a constant and partly inversely as the square root of Z. When R=11, Z=36, when R= 22, Z= ¼ . Write an equation connecting R and Z.

14. Find the length represented by Y in the figure below.
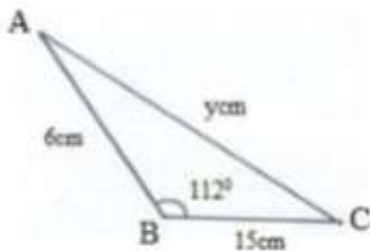
15. Kuloba bought a jembe at 12% discount. After using it for a while she sold it at sh 211.20 which was 80% of its buying price. Find the marked price of the jembe before discount.

16. The figure below represents the linear equation $\log y = n \log x + \log k$.
. Use the graph to find the value of n and k.
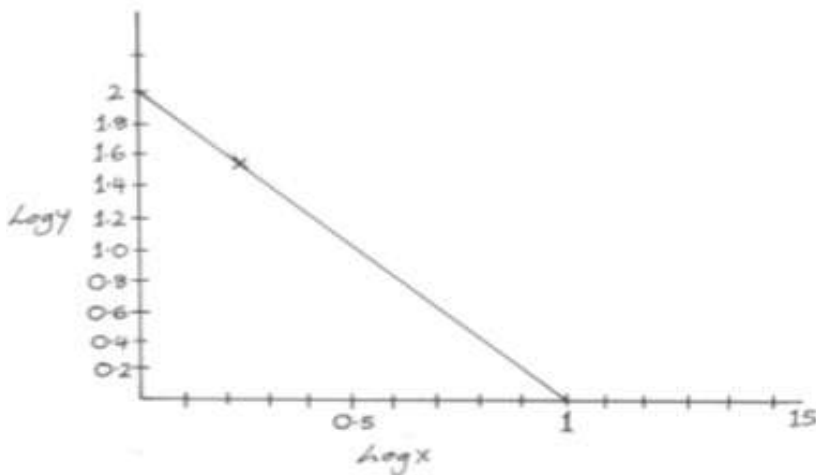
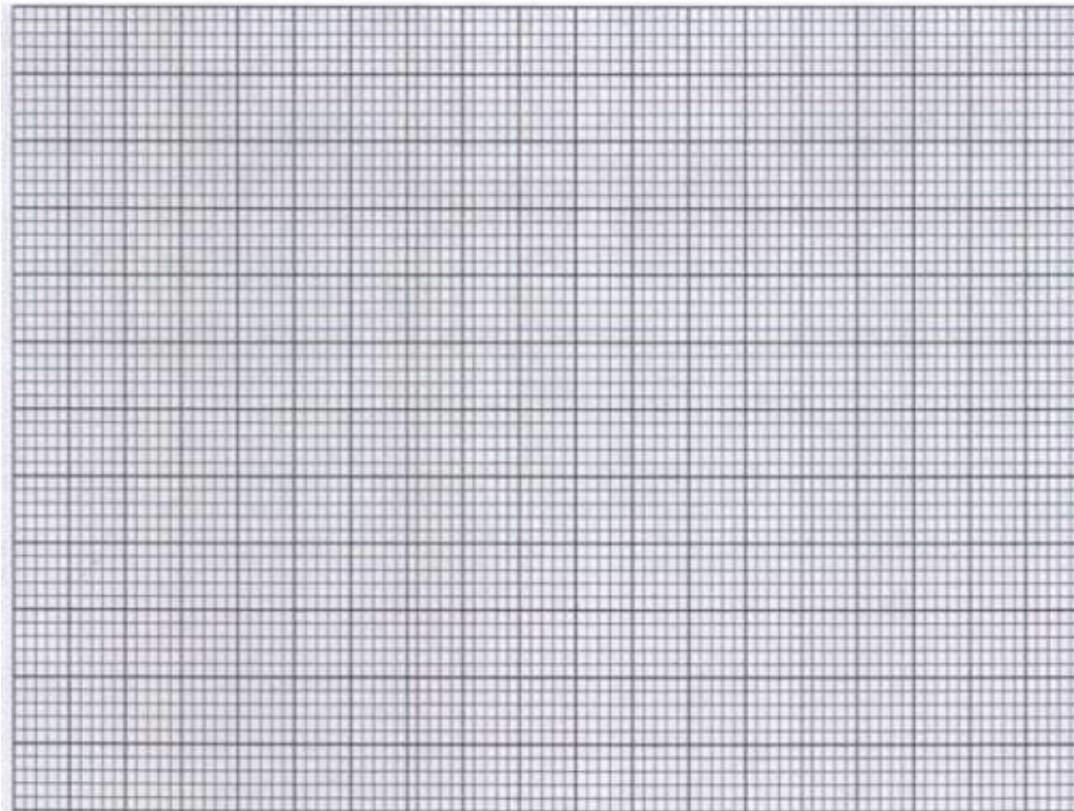a) Use the graph to find the values of n and k.

SECTION II (50 Marks)

Answer ONLY FIVE questions in this section)

17. . A cylindrical water tank can be filled to a depth of 2.1m by a pipe A in 2 hours pipe B takes 7 hours to fill the tank to the same depth. Pipe C can empty this amount in 6 hours. a) i) Starting with the empty tank and pipe A running for one hour, find the depth of water after one hour. (2marks)

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ii) If pipe A is turned off and pipe C is left open for one hour find the depth of water. (2marks)

b) If the tank is initially empty and pipe A and B are both running while pipe C is left open, after how long will the depth of water reach 2m. (3marks)

c) 25 men working 8 hours a day plant trees in a forest plot in 63 days. Calculate the number of days 45 men working 7 hours a day would take to plant the same number of trees (Assume that all the men work at the same rate) (3marks)

18. A car whose initial value is kshs. 600 000 depreciates at a rate of 12% p.a. Determine a) Its value after 5 years. (4marks)

b) The value of depreciation after 5 years. (2marks)

c) The number of years it will take for the value of the car to be Kshs. 300 000. (4marks)

19. The marks scored by 50 students in a math test were as shown below.
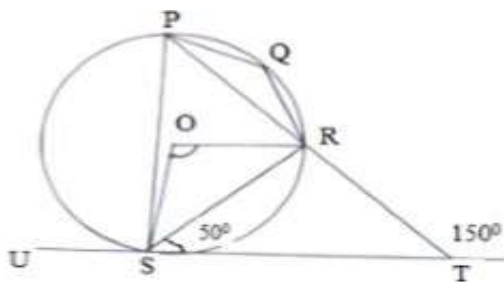
Marks	10 - 19	20 – 29	30 - 39	40 - 49	50 – 59	60 - 69	70 - 79	80 - 89	90 - 99
Frequency	1	2	5	8	13	10	6	3	2

a) State the modal class. (1mark)

b) On the grid provided draw an O give of the above data. (3marks)

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c) From the graph determine i) The median mark. (1mark)

ii) The Quartile deviation. (3marks)

iii) The pass mark if 44% of the students passed the test. (2marks)

20. The figure below P,Q, R and S are points on the circle centre O. PRT and USTV are straight lines. Line UV is a tangent to the circle at S. <RST =50^0 and <RTV=150^0

a) Calculate the size of the following angles giving reasons

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i) <ORS (2marks)

ii) <USP (2marks)

iii) <PQR (2marks)

Given that RT = 7cm and ST=9cm. Calculate to 4 significant figures i) The length of the line PR (2marks)

ii) The radius of the circle (2marks)

21. In the figure below ABCD is a parallelogram such that $AB = a$ $BC = b$ $AE : EB = 3 : 1$, X is the intersection of DE and AC.
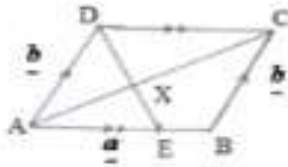
a) Write in terms of a and b the vectors

i) AC (1mark)

ii) DE (1mark)

b) $AX = kAC, DX = nDE$. $AX = AD + DX$
    Find the values of n and k.   (6marks)

c) Find the ratio DX : XE   (2marks)

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21. . Complete the table below for the functions $y = 2Sin(x - 30^0)$ and $y = Cos\ 2x$

x	0^0	30^0	60^0	90	120	150	180	210	240	270	300	330	360
$2Sin(x-30^0)$	-1			1.73	2			0	-1			-1.73	
$Cos\ 2x$	1			-1	-0.5			0.5	-0.5			0.5	

a) On the same set of axes, draw the graphs of $y = 2\ Sin(x - 30^0)$ and $y = Cos\ 2x$ in the range $0^0 \leq x \leq 360^0$
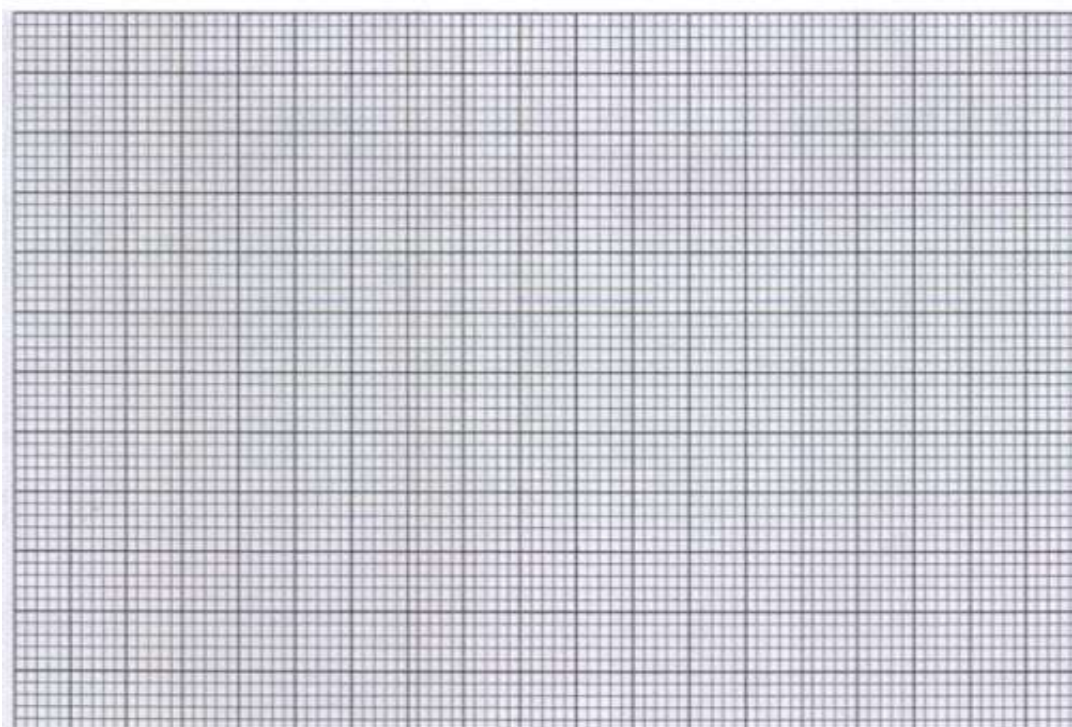
b) Use your graph to solve the equation $2\ Sin(x - 30^0) = Cos\ 2x$ (1mark)
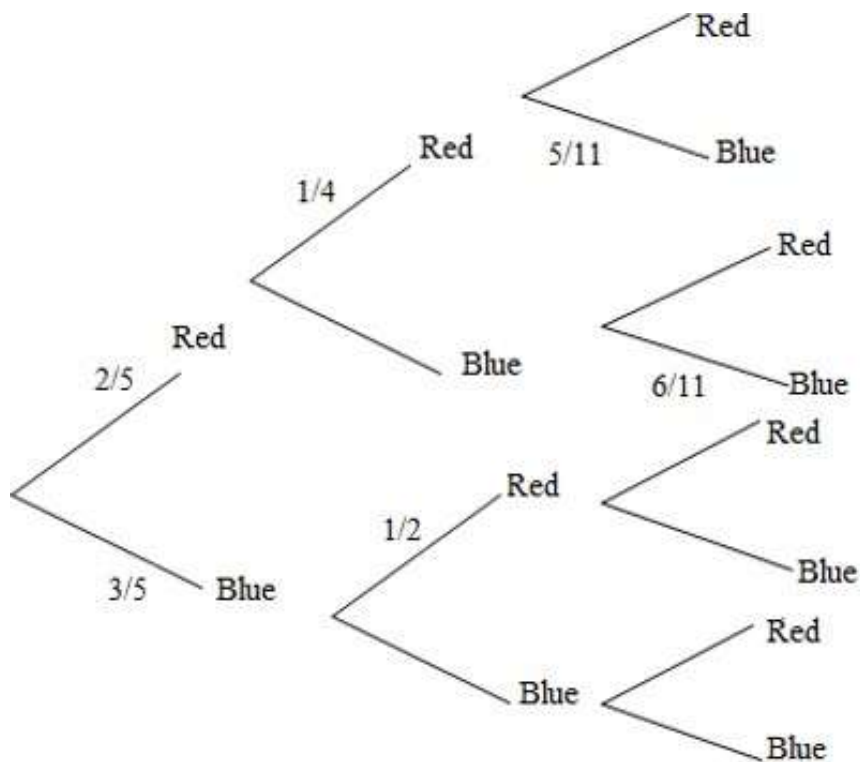
c) State the;

i) Phase angle for the wave $y = 2\sin(x - 30^0)$ (1 Mark)

ii) Period for the wave

$$y = Cos\ 2x$$ (1 mark)

22. . Bag A contains 2 red balls and 3 blue balls Bag B contains 4 red balls and 5 blue balls. Two balls are drawn at random from bag A and placed in Bag B and then a ball is drawn at random from B.

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a) Complete the tree diagram. (4marks)

b) What is the probability that i) All the three balls drawn are of the same colour? (2marks)

ii) The ball from bag B is blue. (4marks)

23. . a) A plane takes off from airport P at $(0^0, 40^0W)$ and flies 1800 nautical miles due East to Q then 1800 nautical miles due South to R and finally 1800 nautical miles due west before landing at S. a) Find to the nearest degree the locations of Q, R and S. (4marks)

b) If the total flight time is 16 hours, find the average speed in knots for the whole journey. (3marks)

c) Find the time taken to fly from R to S, given that this was two hours shorter than the time taken P and Q to R. (3marks)

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