NAME···INDEX.NO·················

SCHOOL····························CANDIDATE'S SIGNATURE····························

DATE···.

121/1

MATHEMATICS

PAPER 1

JULY/AUGUST 2016

TIME: 2 $^1/_2$ HOURS

KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)
MOCK EXAMINATIONS

INSTRUCTIONS TO CANDIDATES

- Write your **name**, **index number**, **signature** and **date** of the examination in the spaces provided
- The paper contains two sections. Section I and section II
- Answer **ALL** questions in section I and any five questions in section II
- Answers and working **must** be written on the question paper in the spaces provided below each question
- Show all steps in your calculation below each question
- Marks may be given for correct working even if the answer is wrong
- Non programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise

FOR EXAMINERS' USE ONLY

SECTION I

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

SECTION II

QUESTION	17	18	19	20	21	22	23	24	TOTAL
MARKS									

GRAND TOTAL

Answer **ALL** the questions from this section.

1. Evaluate: (3mks)

$$\frac{-4 \, OF \, [(-4 + -5 \div 15)] + -3 - 4 \div 6}{84 \div -7 + 3 - -5}$$

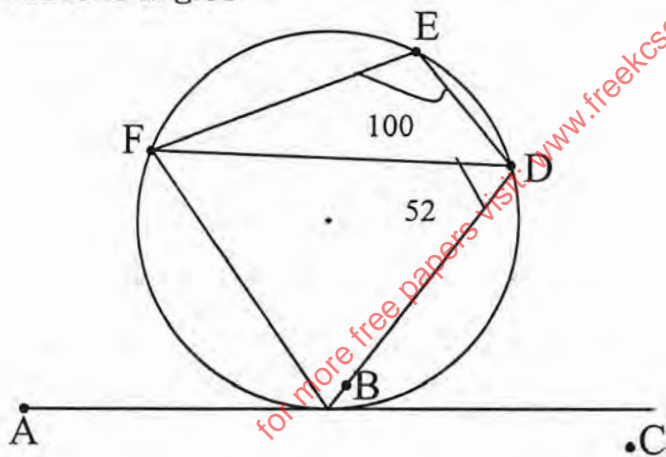2. If log 2=0.30103 and log 3=0.47712 find the logarithm of 36 without using tables or calculators. (3mks)

3. Find the equation of the perpendicular to the line below at its y-intercept. Leave your answer in the form of y=mx + c. (3mks)

$$\frac{4}{9}x - \frac{1}{3}y = 1$$

2

4. Simplify the expression given by $\dfrac{x}{x-3} - \dfrac{2x+3}{x^2-3x}$ (3mks)

5. Under an enlargement the images of the points A(3,1) and B(1,2) are A^1(3,7) and B^1(7,5). Find the centre and the scale factor of the enlargement. (3mks)

6. In the figure below, ABC is a tangent to the circle at B. find giving reasons angles:-

i. FBA (1mk)

ii. DBC (2mks)

7.   Solve for x in the equation below without introducing logarithms
$5^{2x-1} = 60^{2x-1}$ (3mks)

8.   The table below shows masses of fifty students in a form one class.

Mass (kg)	Frequency
25–30	6
30–35	10
35–40	24
40–45	7
45–50	4

a) State the modal class.   (1mk)

b) Calculate to 3 d.p the median mass.   (2mks)

9.   Solve the following pair of linear inequalities. Hence determine the integral values that satisfy the inequalities. $-5 - 2x < -3$ and $\frac{x}{5} + \frac{1}{3} \leq 1$.
                                                                                              (3mks)

10. Given that the position vectors of points P and Q are $r = \begin{pmatrix} -4 \\ -2 \end{pmatrix}$ and $q = \begin{pmatrix} 5 \\ 4 \end{pmatrix}$. M is a point on PQ such that PM:MQ = 2:1. Find the coordinates of M.

(3mks)

11. Calculate the area of the shaded region. (3mks)

$y = 8 - x^{2}$

$y = x^{2}$

2
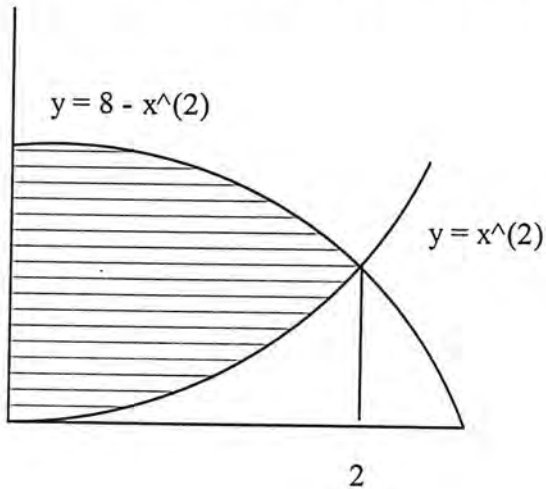
12. Use square, squareroot and reciprocal tables only to evaluate the following giving your answer to 2 decimal places.

(3mks)

$$\frac{2}{\sqrt{34.46}} + \frac{2}{(8.67)^2}$$

13. Solve the simultaneous equations. (4mks)

$$\frac{p}{q+1} = \frac{1}{4}, \quad \frac{p-3}{p+q} = \frac{2}{3}$$

14. The angle of elevation of the top of the tower from the foot of a building is 63.51^0. the angle of depression of the top of the building from the top of the tower is 18.43^0. the building and the tower are 30 m apart. Find:
    a) The height of the tower. (1mk)

    b) The height of the building. (2mks)

15. Two towns M and N are 300km apart. A lorry left town M at 10.00a.m and travelled towards N at an average speed of 80km/h. At 10.45a.m a Nissan matatu left town N for town M at an average speed of 100km/h. calculate the distance covered by the lorry when it met the Nissan matatu. (3mks)

6

16. A commercial bank in Kenya buys and sells Foreign currencies as shown below;

Currency	Buying (Ksh)	Selling(Ksh)
1 Euro	102.15	102.26
100 Japanese Yen	75.73	75.82

A Japanese travelling from Italy arrives in Kenya with 9000 Euros. He converts all the 9000 Euros to Kenya shillings at the bank. While in Kenya he spends Ksh.398,580 and then converts the remaining kshs to Japanese yen at the bank before leaving for Japan. Calculate the amount in Japanese yen that he receives.

(4mks)

SECTION II (50 MKS)

Answer **only 5** questions from this section.

17. The attendance at a party consisted of 35 men, a number of women and some children. The number of women was one and a half that of the children present.

    a) If there are a total of 65 participants, how many women attended the party?   (3mks)

    b) During the party, each child took one bottle of soda, the men took two bottles each while some women took two and others three. Given that five crates each containing 24 bottles of soda were consumed, how many women took two bottles of soda?   (5mks)

    c) Each crate of soda was bought for sh.432 plus a deposit of sh.10 per bottle incase it broke. How much money did the party organizers pay at the soda depot?   (2mks)

18. Three warships P, Q and R are at sea such that ship Q is 400km on a bearing of N30°E from ship P. Ship R is 750km from ship Q on a bearing of S60°E from ship Q. An enemy ship S is sighted 1000km due south of ship Q.

    a) Use scale drawing to locate the positions of ships P, Q, R and S.   (4mks)

b) Find the compass bearing of: (2mks)

    i.   Ship P from ship S.

    ii.   Ship S from ship R.

c) Use the scale drawing to determine: (2mks)

    i.   The distance of S from P.

    ii.   The distance of R from S.

d) Find the bearing of: (2mks)
    i.   Q from R.

ii. P from Q.

19. A bus and a matatu left vihiga for Moi's Bridge, 240 km away at 8.00a.m. They travelled at 90km/h and 120km/h respectively. After 20 minutes the matatu had a puncture which took 30 minutes to mend. It then continued with the journey.

a. How far from Vihiga did the matatu catch up with the bus? (6mks)

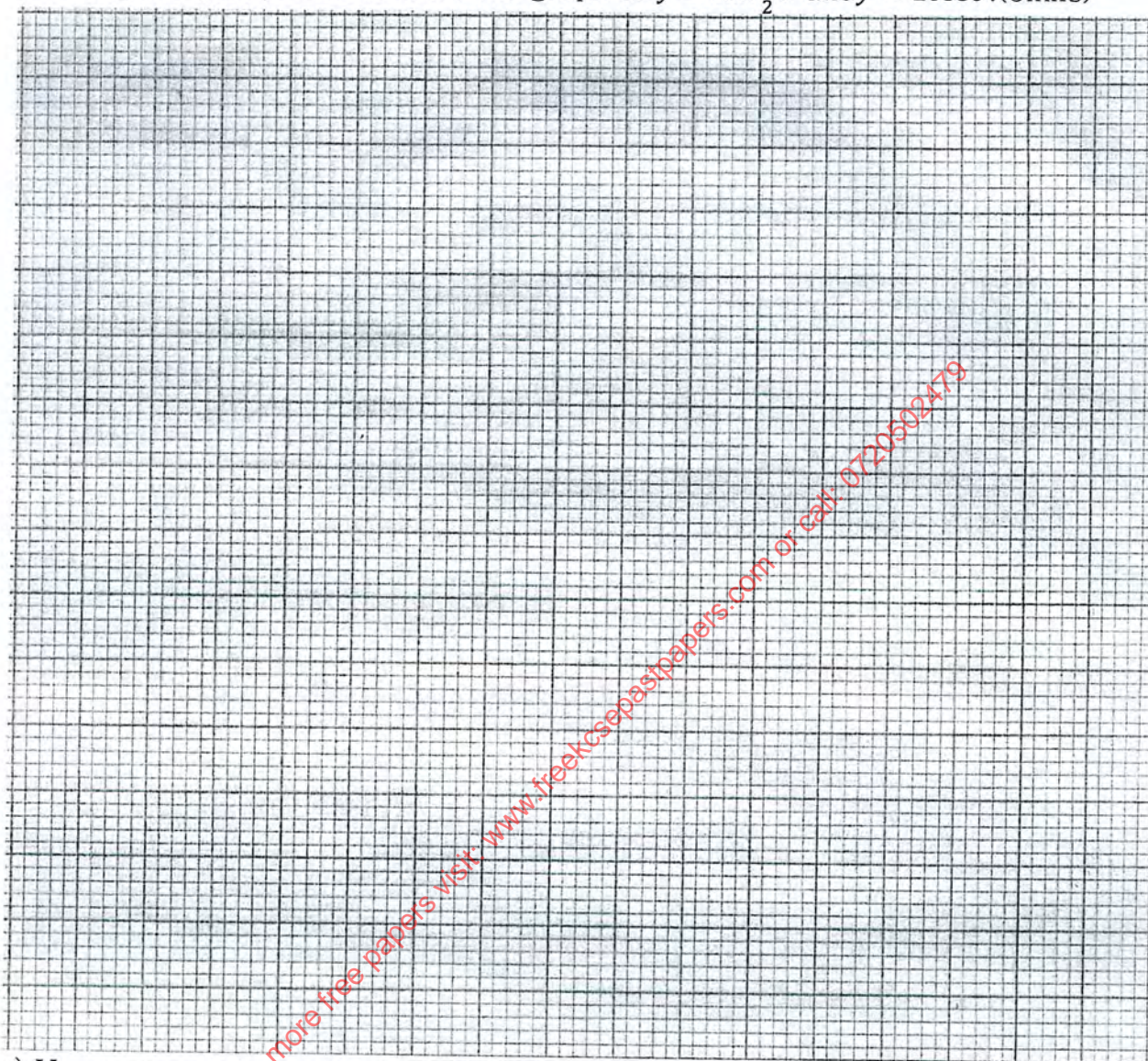b. At what time did the matatu catch up with the bus? (2mks)

c. At what time did the bus reach Moi's Bridge? (2mks)

20. (a) Complete the table below. (2mks)

θ	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$\tan \frac{1}{2}\theta$	0	0.27		1	1.73	3.73		-3.73	-1.73		-		0

10

									0.58		
2cosθ	1.73	1			-1.73		-1.73	0	1	1.73	2

b) Using the grid provided draw the graph of $y = tan\frac{1}{2}\theta$ and $y = 2cos\theta$. (5mks)

c) Use your graph to solve;

i. $Tan\frac{1}{2}\theta - 2cos\theta = 0$ (1mk)

ii. $2cos\theta - 1.5 = 0$ (2mks)

21.   (a) Express as a single fraction in its simplest form $\frac{200}{x} - \frac{200}{x+4}$

           (2mkks)

(b) When driven in town, a car runs x km on each litre of petrol.

  i.   Find in terms of x, the number of litres of petrol used when the car is driven 200km in town. (1mk)

  ii. When driven out of town, the car runs x+ 4 km on each litre of petrol. It uses 5 litres less petrol to go 200km out of town than to go the same distance in town. Use this information to write down an equation involving x, and show that it simplifies to $x^2 + 4x - 160 = 0$ (3mks)

  (c) Solve the equation $x^2 + 4x - 160 = 0$ (3mks)

  (d) Calculate the total volume of the petrol when the car is driven 40km in town. (1mk)

22. The figure below shows two circles intersecting at C and D. The centres are A and B with radii 8cm and 6cm respectively. AB = 10cm.
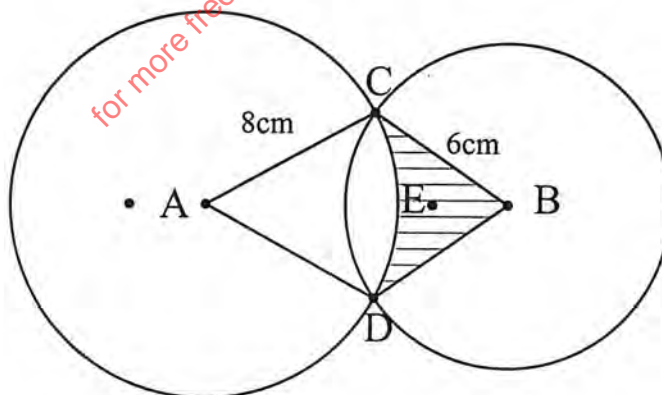
Determine:

  i.   Size of angle DAC. (4mks)

12

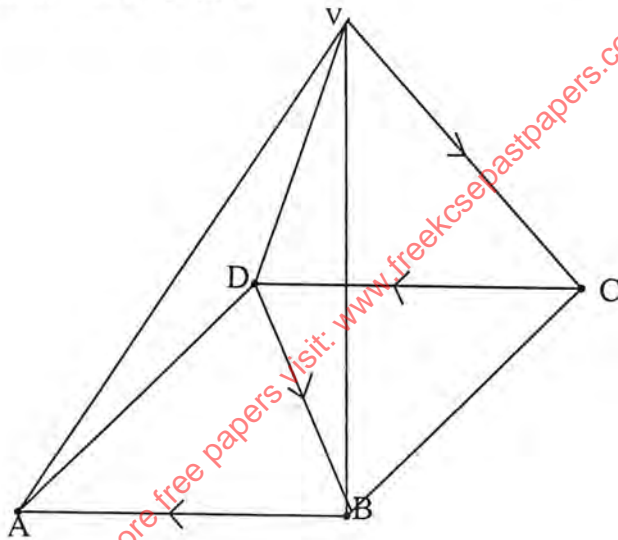ii.   Size of angle DBC.   (2mks)

iii. Area of sector of ACMD.   (2mks)

iv.   Area of the shaded region.   (2mks)

23.   The figure below shows a right pyramid standing on a square base ABCD
and with a path marked on it.

a. Sketch the net of the pyramid and label all the vertices.   (2mks)

b. On the sketch show the path marked on the diagram.   (2mks)

c. Given that the pyramid above has measurement AB= BC=20cm and the slant height of the pyramid is 26 cm, calculate the surface area of the pyramid. (6mks)

24.   As a car passes the point P on a straight road, its speed is 15m/s with a uniform acceleration of $0.25m/s^2$ for 20 seconds until it reaches the point Q. the car travels for a further 10 seconds with a constant acceleration of $0.5m/s^2$ until it reaches point S.
 a. Find;
   i.   The speed at Q.   (2mks)

   ii.   The distance PQ.   (2mks)

   iii. The speed at S.   (2mks)

 iv.   The total distance travelled.   (2mks)

  b. Calculate the average speed of the car between P and S leaving your answer as a mixed number.
          (2mks)

14