Name…………………………………… ………………………..………… Index No:…………………………..

121/2 Candidate's Signature …………..……………
MATHEMATICS Date: …………………………
PAPER 2
JULY/AUGUST- 2014
TIME: 2 ½ HOURS

MIGORI DISTRICT JOINT EVALUATION EXAM

Kenya Certificate of Secondary Education (K.C.S.E.)

121/2
Mathematics
Paper 2
2 ½ Hours

INSTRUCTIONS TO CANDIDATES

- Write your **name** and **index number** in the spaces provided at the top of the page.
- The paper contains two sections; section I and II.
- Answer ***all*** the questions in section I and any five questions from section II.
- All answers and working **Must** be written on the question paper in the spaces provided below each question.
- Non- programmable silent electronic calculators and **KNEC** mathematical tables may be used except where stated otherwise.
- Mark may be given for correct working even if the answer is wrong. .

For Examiners Use Only

Section I

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

Section II

Question	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**Total**

GRAND TOTAL

This paper consists of 16 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

Section I

1. Use logarithms table to evaluate giving your answer to 3 s.f (4mks)

$$\left(\frac{3.58x0.0271}{\log 4.2}\right)^{\frac{-2}{3}}$$

2. On average , the rate of depreciation of a water pump is 9 % per annum. After three complete years it was Kshs. 150,700.

Find its value at the start of the three year period. (3mks)

3. Given that b = $\dfrac{t}{\sqrt{h^2+k^2}}$ make h the subject of the formula . (3mks)

4. Quantity y is partly constant and partly varies inversely as the square of P. y = 7. 125 when p = 16 and y = 5.28 when p = 25. Find y when P = 20 (4mks)

5. If $\frac{\sqrt{14}}{\sqrt{7}-\sqrt{2}}$ - $\frac{\sqrt{14}}{\sqrt{7}+\sqrt{2}}$ = $\frac{a\sqrt{7}}{b}$ (3mks)

Find the values of a nd b, where a and b are rational numbers .

6. A coffee blender mixes 6 parts of type A with 4 parts of type B. type A costs sh. 72 while type B costs sh. 66 per kg. At what price should he sell the mixture per kg in order to make 5% profit give your answer to the nearest ten cents. (3mks)

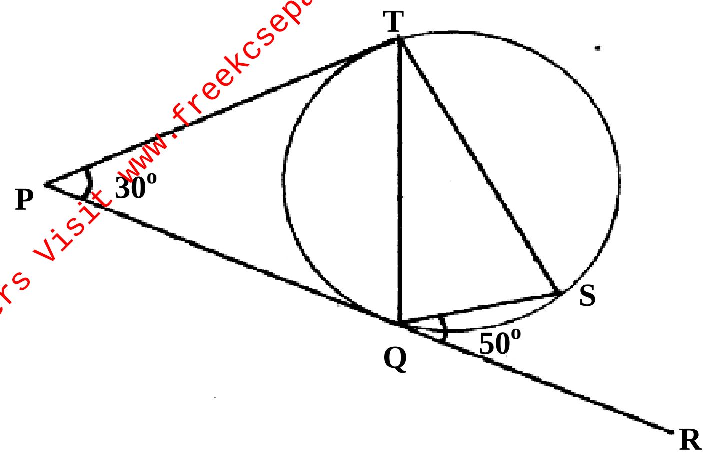
7. (a) Expand $\left(x+\frac{2}{x}\right)^4$ upto the constant term of expression (1mk)

(b) By getting a suitable for x, use your expansion in (a) above to evaluate (10.2)4 (3mks)

8. Given that x = 2i + J – 2k , y = -3i + 4j – k, and z = -5i + 3j + 2k and P = 3x – y + 2z calculate the magnitude of P correct to 3 significant figures . (3mks)

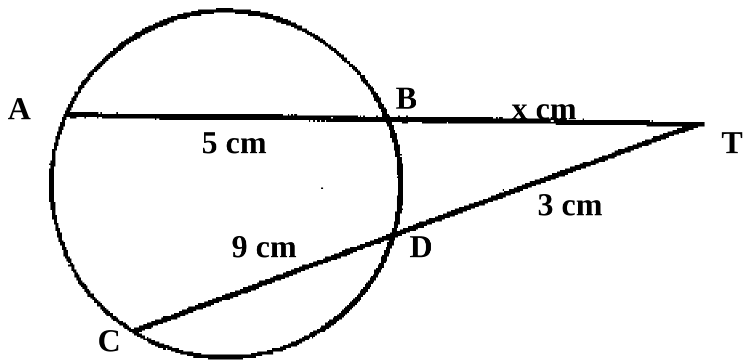
9. Solve for x where 0o $\leq x \leq$ 360o in the equation sin $\left(\frac{5}{2}x-60\right)^0$ = - 0.5 (3mks)

10. On the figure below PQR and PT are tangents to the circle at Q and T respectively. Angle RPT = 30° and angle RQS = 50°. giving reasons for your answer find the size of angle PTS. (2mks)



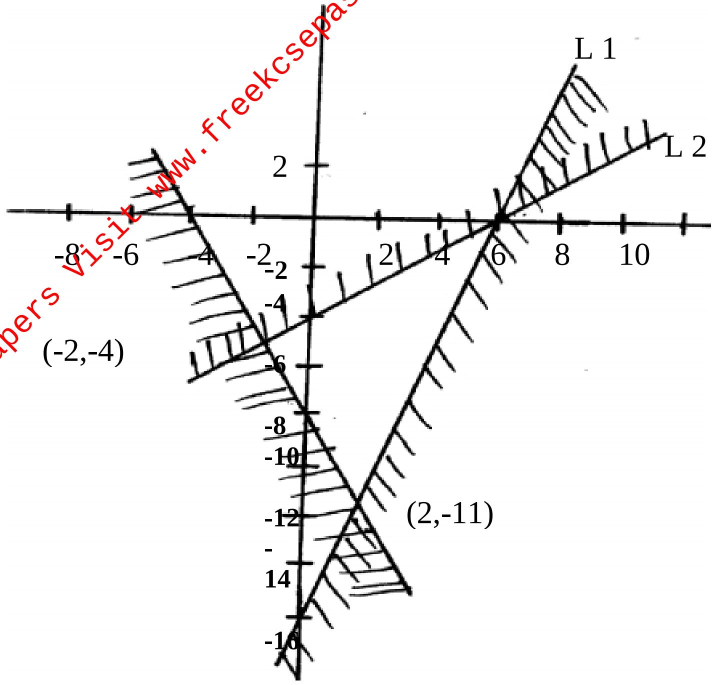
11. Draw a line PQ = 7.2 cm and on side of the line, use a ruler and pair of compasses only to draw the locus of a point A such that ∠PAQ = 60o and on it mark points A such that PA = QA (3mks)

12 . In the figure below AB and CD intersect externally at T. Find the value of X. (3mks)



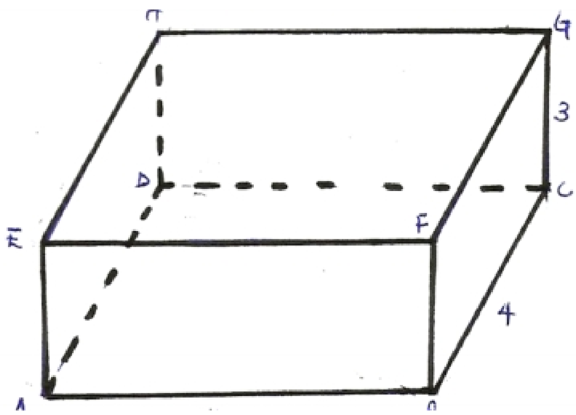
13. A circle centre O has the points P(-1,2) and Q (3,2) as the end points of its diameter. Determine the equation of the circle. (2mks)

14. Write down the three linear inequlities that define the unshaded region R shown below. (3mks)



15. Evaluate $\int_0^4 (x-4)(x+1)dx$

16. The below is cuboid with dimensions as hsown below



Calculate the length of AG (3mks)

17. On the grid provided below

(a) Draw triangle ABC whose coordinates are A (8,6) B (6,10) and C (10,12) and its image A′B′C′ after undergoing a reflection in the line y = x . write the coordinates of A′B′C′ (4mks)

(b) Triangle A′B′C′ undergoes an enlargement centre (0,0) scale factor ½ to form triangle A″B″C″ draw Triangle A″B″C″and state its co-ordinates (3mks)

(c) Triangle ABC is stretched with y – axis invariant and stretch factor of 0.5 to obtain A‴B‴C‴. draw triangle A‴B‴C‴. (3mks)

18. One day during inspection in a certain school it was discovered that there was a probability of 2/5 that a student had shaggy hair if a student had a shaggy hair, there was probability of ½ that he had torn uniform. But if he had properly kept hair, there was a probability of ¼ that he had a torn uniform. If a student had a torn uniform, there was a probability of 4/5 that he had unpolished shoes, otherwise there was a probability of 3/5 that he had polished shoes.

(a) Present this information in a tree diagram. (2mks)

(b) Find the probability that

(i) a student had all three faults. (2mks)

(ii) A student had exactly two faults (2mks)

(iii) A student has no fault at all (2mks)

(iv) A student has shaggy hair with polished shoes. (2mks)

19. (a) Complete the table below for the function of Y = 3 sin (2x + 30o) and y = Cos (x- 60°) for $0^o \leq x \leq 360^o$ (2mks)

X	0°	30°	60o	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
3 sin (2x + 30)	1.50	3.00	1.50		-3.00	-1.50		3.00		-1.80	-3.00		1.50
Cos (x – 60)	0.50		1.00	0.87	0.5	0.00		-0.87	-1.00	-0.87	-0.50	0.00	0.50

(b) Plot the graph of the two functions on the same axes. (5mks)

(c) ‘Use your graph to solve the following.

(i) $3 \sin (2x + 30^o) = 0.8$ (1mk)

(ii) $3 \sin (2x + 30^o) - \text{Cos}(x - 60^o) = 0$

(d) Determine the periodic angle of function $y = 3 \sin 3 \sin (2x + 30^o)$. (1mk)

20. In a GP the sum of the 2^{nd} and 3^{rd} terms is 24 and the sum of the 3^{rd} and 4^{th} terms is 72.
(a) find the first term and the common ratio. (6mks)

(b) Determine the sum of the first 4 terms. (4mks)

21. The table below shows corresponding values of A and B that are known to satisfy the equations.
A = KBn + 1.6 where K and n are constants.

A	4.76	11.6	24.0	72.4	252.8
B	1.0	2.0	3.16	6.31	10.0

(a) Draw a suitable straight line graph to represent the above information. (7mks)

(b) Using the graph determine the values K and n (2mks)

(c) State equation connecting A and B (1mk)

22. Two towns on Latitude $30^{o}S$ are 3000km a part. Find the longitude difference of the two towns. (take $\pi = 22/7$ and the radius of the earth to be 6370km. (3mks)

(b) The positions of airport P and Q are (60oN,45oW and Q ($60^{o}N$, $K^{o}E$). It takes a plane 5hrs to travel due east from p and Q average speed of 600knots.

(i) Calculate the value of K. (2mks)

(ii) The local time at P is 10.45 a.m. what is the local time at Q when the plane reaches there? (3mks)

(d) Calculate the shortest distance between ($30^{o}S$, $36^{0}E$) and ($30^{o}S$, $144^{0}W$) in nautical (2mks)

23. The table below shows the marks scored by students in chemistry exams.

Marks	30-34	35-39	40-44	45-49	50-54	55-59	60-64
No of studetns	3	6	5	12	8	9	7

(a) Find the mean of the above data using an assumed mean of 47 (3mks)

(b) Find:

(i) The standard Deviation (3mks)

(ii) The lower quartile (2mks)

(iii) The upper quartile. (2mks)

24. A bus company runs a fleet of two types of buses operating between Nairobi and Migori. Type A bus has a capacity to take 52 passengers and 200kg of luggage. Type B carried 32 passengers and 300kg of luggage. On a certain day , there was 500 passengers with 3500kg of luggage to be transported. The company could only use a maximum of 15 buses altogether.

(a) If the company uses x buses of type A and y buses of type B write down all the inequalities satisfied by the given conditions. (4mks)

(b) Represents the inequalitites graphically and use your graph to determine the smallest number of buses that could be used. (4mks)

(c) If the cost of running one bus of type A is Kshs 7200/- and that of running one bus of type B Kshs.6000/- . find the minimum cost of running the buses. (2mks)