

Name..... Adm No..... Class.....

121/1

Mathematics

Paper I

2 ½ Hours

June 2014

# KASSU JOINT EVALUATION TEST (J.E.T)

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

### INSTRUCTIONS TO CANDIDATES

- Write your name and Admission number in the spaces provided at the top of this page.
- This paper consists of two sections: Section I and Section II.
- Answer ALL questions in section 1 and ONLY FIVE questions from section II
- All answers and workings must be written on the question paper in the spaces provided below each question.
- Show all the steps in your calculation, giving your answer at each stage in the spaces below each question.
- Non – Programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

### 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

17	18	19	20	21	22	23	24	TOTAL

#### GRAND TOTAL

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SECTION I-(answer all the 16 question in this section-50MARKS)

1. Use tables of square roots and reciprocals tables to evaluate to 3 decimal places the problem below.

$$\frac{10}{\sqrt{0.625}} + \frac{4}{\sqrt{164}}$$

(3mks)

2. By letting  $P = 4^{-y}$  in the equation  $4^{-2y+1} - 3 \times 4^{-y} - 10 = 0$ .

a) Write the above equation in terms of P.

(1mk)

b) Hence find the possible values of y.

(3mks)

3. The heights of two similar pails are 12cm and 8cm. The larger pail can hold 2 litres. What is the capacity of the smaller pail?

(3mks)

4. A tourist arrived in Kenya with sterling pound (£) 4680 all of which he exchanged into Kenyan money. He spent Ksh. 52,352 while in Kenya and converted the rest of the money into U.S dollars. Calculate the amount he received in U.S dollars. The exchange rates were as follows. (3mks)

Currency	Buying	Selling.
US \$	65.20	69.10
Sterling Pound (£)	123.40	131.80

5. Find the equation of the perpendicular bisector of the line AB where A is (3, 9) and B is (7, 5) giving your answer in the form  $ax + by + c = 0$ . (3mks)

6. Solve the following inequality and show your solution on a number line.

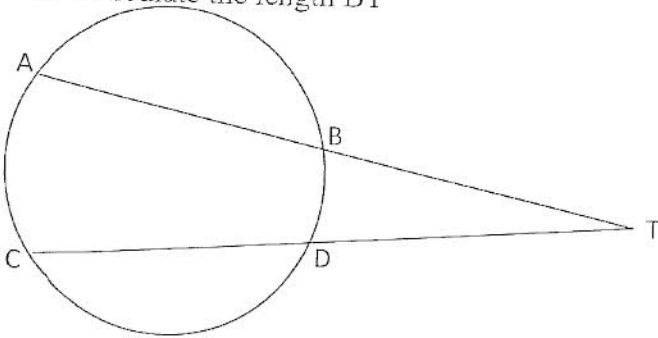
$$4x - 3 \leq \frac{1}{2}(x + 8) < x + 5$$

(3mks)

7. From a viewing tower 30 metres above the ground, the angle of depression of an object on the ground is  $30^\circ$  and the angle of elevation of an aircraft vertically above the object is  $42^\circ$ . Calculate the height of the aircraft above the ground. (3 mks)

8. Estimate the area bounded by the curve  $y = \frac{1}{2}x^2 + 5$ , the x-axis, the line  $x=1$ , and  $x=5$  using trapezium rule with 4 trapezia. (3mks)

9. Intersect chords in the figure below  $CD = 4\text{cm}$ , line  $DT = 8\text{cm}$  and  $AB = 6\text{cm}$ . AT and CT meet at point T. Calculate the length BT (3mks)



10. Find the standard deviation of the data below; (3mks)  
35, 37, 37, 40, 30, 34, 33, 38

11. On the line segment AB below:

- Construct on one side of AB the locus of P, such that  $\angle APB = 90^\circ$
- Measure the length  $\frac{AB}{2}$  and hence calculate the area enclosed by the locus P and the line segment AB. (4mks)



12. A carpenter constructed a closed wooden box with internal measurements 1.5 metres long, 0.8 metres wide and 0.4 metres high. The wood used in constructing the box was 1.0cm thick and has a density of  $0.6\text{g/cm}^3$ . Determine the mass, in kilograms, of the wood used in constructing the box. (Leave your answer to 1 decimal place). (3mks)

SECTION II (Answer only any five questions in this section-50 MARKS)

17. A surveyor recorded the measurements of a field book using XY=400m as the base line as shown below.

	Y	
To E 200	320	
	210	150 To D
To F 250	170	150 To C
	50	225 To B
	X	100 To A

a) Use a scale of 1cm to represent 50m to draw the map of the field.

(5mks)

b) Find the area of the field in hectares

(5mks)

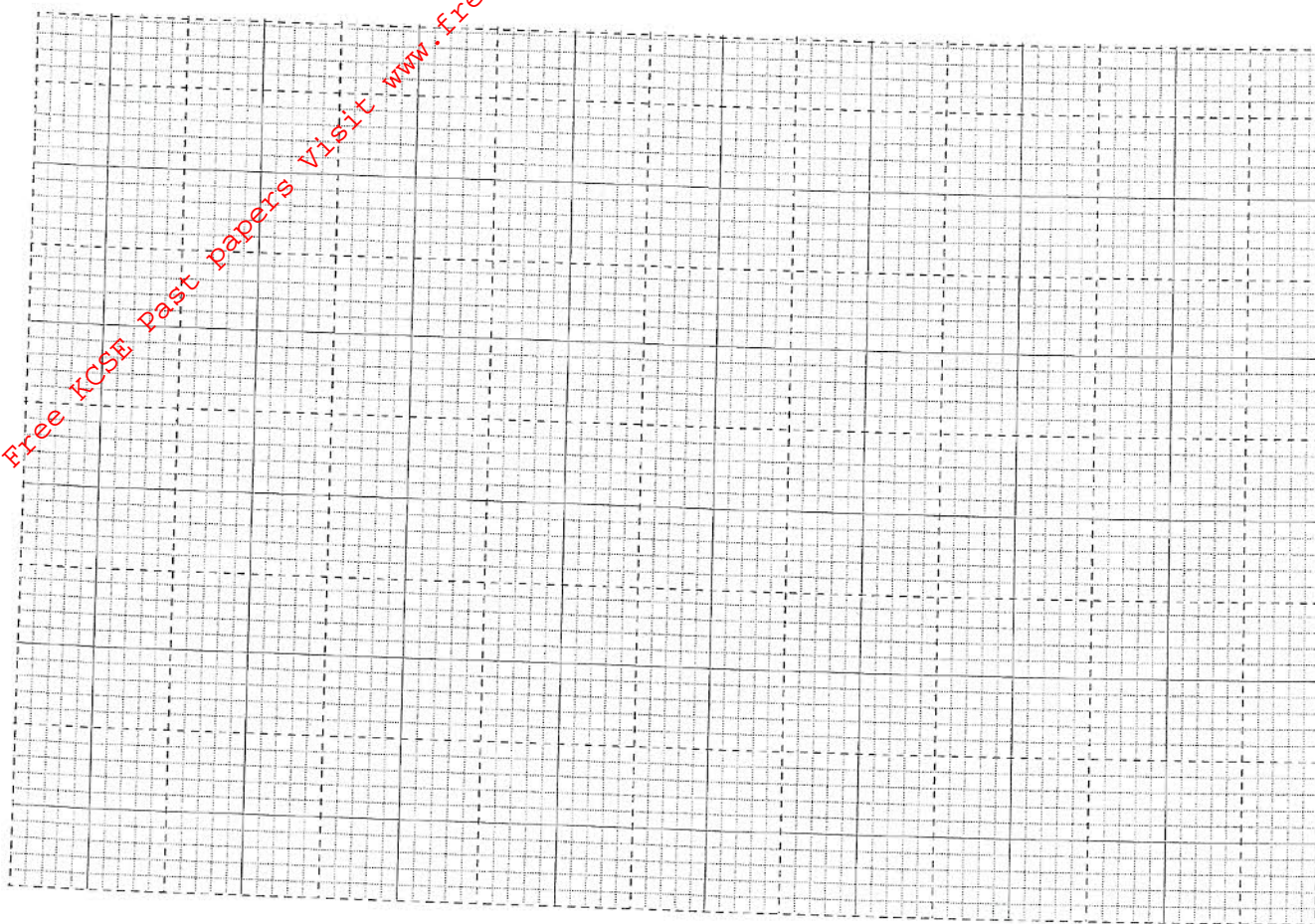


18. (a). Use graphical methods to solve the simultaneous equations below.

$$7x = y + 12$$

$$3x = 2y + 2$$

(5mks)



(b). Use matrix method to solve for the values of  $x$  and  $y$  that will satisfy the simultaneous equations below. (5mks)

$$7x - y = -33$$

$$3x - 2y = -22$$

19. a) Train A leaves a station 45 minutes before train B. Both trains travel in the same direction and their speeds are 36km/h and 48km/h respectively.

i) How long will it take train B to catch up with train A? (3mks)

ii) How far from the start were the two trains when they met.

(2mks)

b) A car accelerated from rest to a velocity of 10m/s in 10 seconds. It travelled at this velocity for 20 seconds and then came to a stop in 5 seconds. Find;

i) The initial acceleration.

(2mks)

ii) The distance travelled.

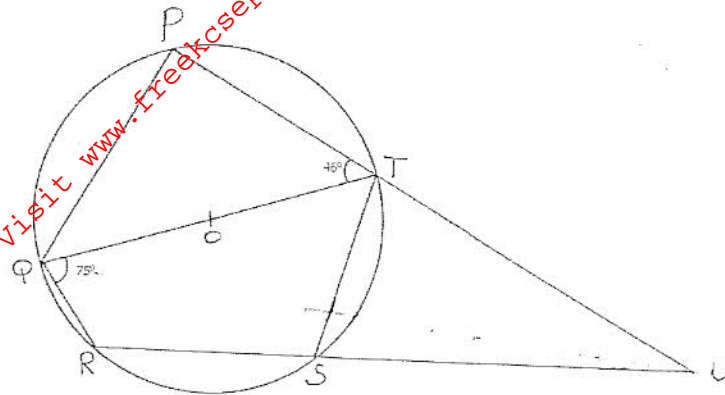
(2mks)

iii) The average velocity.

(1mk)



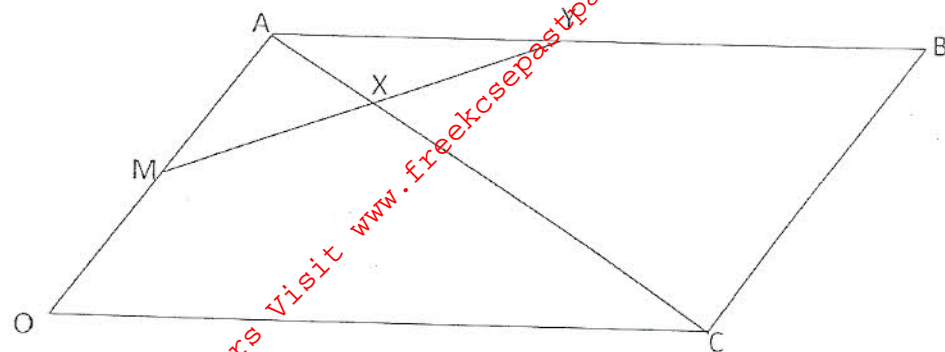
20. The figure below shows a circle centre O in which QOT is the diameter Angle  $\angle QTP = 46^\circ$ , angle  $\angle TQR = 75^\circ$  and angle  $\angle SRT = 38^\circ$ , PTU and RSU are straight lines.



Determine the following, giving reasons in each case:

- (a) Angle RST (2mks)
- (b) Angle SUT (2mks)
- (c) Angle PST (2mks)
- (d) Obtuse angle ROT (2mks)
- (e) Angle SQT (2mks)

21. OABC is a parallelogram M is the midpoint of OA and  $AX = \frac{2}{7} AC$ ,  $OA = \mathbf{a}$  and  $OC = \mathbf{c}$



a) Express the following in terms of vectors  $\mathbf{a}$  and  $\mathbf{c}$

i)  $\mathbf{AC}$

(1mk)

ii)  $\mathbf{AX}$

(1mk)

iii)  $\mathbf{MX}$

(2mks)

b) If  $AY = hAB$  and  $MY = kMX$ . Express  $\mathbf{MY}$  in two different ways hence find the scalars  $h$  and  $k$   
(4mks)

c) Find the ratio  $AY: YB$

(2mks)

23. The following are masses of 25 students in form 4 class.

49, 51, 50, 60, 55, 45, 56, 51, 58, 59, 40, 54, 44,

44, 42, 59, 50, 62, 46, 43, 57, 56, 52, 43, 41,

- (a) Prepare a frequency distribution table with a uniform class size starting with the class 40 – 43. (4mks)

- (b) Estimate the median mass (3mks)

- (c) Draw a histogram for the data. (3mks)



24.

A school has to take 560 people for a tour. There are two types of buses available. Type X and type Y. Type X can carry 70 passengers and type Y can carry 40 passengers. They have to use at least 10 buses. Buses of each type must not be less than 3.

(a) Form all linear inequalities to represent the above information (3mks)

(b) On the grid provided, draw the inequalities and shade the un-wanted region. (3mks)

(c) If the charges for hiring the buses are;

Type X: shs.40,000

Type Y: shs.30,000

(i) Use your graph to determine the number of buses of each type that should be hired to minimize the cost (3mks)

(ii) find the minimum cost (1mk)

