456/1
MATHEMATICS

Paper one
July/Aug 2022
2 ½ hours

KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education
MATHEMATICS

Paper one

2 ½ HOURS

INSTRUCTIONS

- *Answer all questions in section A and any five from section B,*
- *Any additional questions answered will not be marked.*
- *All necessary calculations must be done on the same page as the rest of the answers.*
- *Only silent non – programmable scientific calculators may be used.*

SECTION A (40marks)

Answer all Questions in this section

1. Given A=$\begin{pmatrix} 4 & 5 \\ 2 & 2 \end{pmatrix}$ find A^{-1}, the inverse of matrix A **(4 marks)**

2. If tan Q = $\frac{3}{4}$, and $0 \leq Q \leq 90$,show that $sin^2Q + cos^2Q = 1$. **(4 marks)**

3. Factorise completely.

i. $25 - (x-2)^2$ **(2 marks)**

ii. $x^2 - 9$ **(2 marks)**

4. Find the numbers such that if its square is subtracted from seven times the number, the result is 6. **(4 marks)**

5. Determine the solution set of the inequality. $\frac{1}{4}y + 5 \geq 1 + \frac{y}{2}$. **(4 marks)**

6. Use substitution method to solve $\begin{matrix} 4x + 3y = 19 \\ y + x - 5 = 0 \end{matrix}$. **(4 marks)**

7. Given that $x \downarrow y = 2x^2 + 3y$ find the values of a if $2 \downarrow a = a \downarrow 3$. **(4 marks)**

8. Make t the subject of $R = \frac{t^2}{(t-a)(t+a)}$ **(4 marks)**

9. Find the coordinates of the image of a point $P(-3,4), Q(7,-1)$ under a reflection in y-x=0. **(4 marks)**

10. Given that a+b=100 and ab=8, find the values of

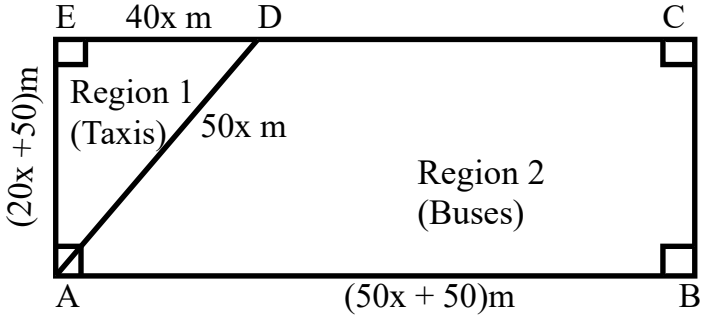
i. $\frac{1}{a} + \frac{1}{b}$ **(2 marks)**

ii. $\left(a \div \frac{1}{b}\right)^2$. **(2 marks)**

SECTION B (60 marks)

Attempt not more than five numbers.

11.A parking yard was designed in a way that it has two regions. One region to park busses and the other region to park taxis as shown below.



Region 1 is in form of a triangle ADE with AE=(20x+50) m, ED=40x m, AD=50x m, and ABCE is a rectangle with AB=(50x+50) m. find

a. The length and width of the parking yard. **(7 marks)**

b. The area of region 2 where buses are parked. **(5 marks)**

12. A triangle ABC has vertices A (-5, -1) B (0,4) and C(5,1). It is mapped onto A' B' C' by the transformation $\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$

a. Find the coordinates of A' B' C', hence describe the matrix of transformation. **(4 marks)**

b. Triangle A' B' C' is mapped onto A" B" C" with vertices A" (6,-34) B"(16,16) C"(-6,34). Find the matrix of transformation. **(5 marks)**

c. Find a single matrix of transformation which maps ABC onto A"B"C". **(3marks)**

13. Use graphical method to solve $y = 6 + 3x - 2x^2$ and $y = 2x$ for $-2 \leq x \leq 4$. **(12 marks)**

14. Using a ruler, pencil and pair of compass only, **(12 marks)**

i. Construct a quadrilateral ABCD in which AB=9cm <ABC=105^0, BAD=60^0, BC=AD+5.5cm.

ii. Draw and measure diagonal $\overline{DB}$

b. Draw a circumscribing circle through ABD, measure its radius.

15. A box contains 8 Red beads and 5 Yellow beads. If two beads are picked at random from the box one after the other without replacement,

a. Draw out the possible outcomes on a probability tree diagram. **(3 marks)**

b. Find the probability that **(5 marks)**

i. Both beads are yellow

ii. The first bead is red

c. Show that the sum of possibilities of picking beads of the same color and that of different colors is 1. **(4 marks)**

16. A shopkeeper is to transport at least 240 crates of bear from the factory to his shop. He has a lorry that carries 90 crates of beer per trip and a pick-up which can carry 20 crates per trip. The cost of each trip is Shs 50,000 for the lorry and Shs 15,000 for the pick-up. She

has only Shs 180,000 available transport. If x represents the number of trips for a lorry and y represents those of a pick-up,

a. Write down four inequalities to represent the given equation. **(4 marks)**

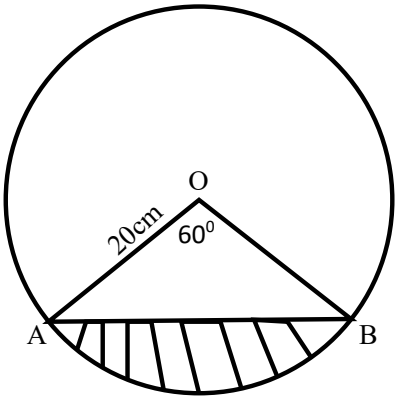
b. Plot those inequalities on the same graph paper. **5 marks)**

c. Use the graph to find the possible number of trips to be made by the lorry and the pick-up, hence find the minimum cost of transporting the crates of beer.

(3 marks)

17. A copper wire bent in form of square encloses an area of $4900m^2$. If the same wire is bent in form of a circle, find the area enclosed by it. **(5 marks)**

b. In the figure is a chord AB of a circle of radius 20cm and center O subtends with an angle of 60^0 at the center. Find the area of the shaded part.



i. Find the area of the shadow part of the circle. **(7 marks)**

END