456/1
MATHEMATICS
Paper 1
July - August 2017
2 ½ hours

KASSHPA

**KAYUNGA SECONDARY SCHOOLS HEAD TEACHERS AND PRINCIPALS
ASSOCIATION (KASSHPA)
JOINT MOCK 2017
MATHEMATICS
PAPER ONE
2 HOURS 30 MINUTES**

INSTRUCTIONS TO CANDIDATES

- Answer **all** questions in Section A and any **five** questions from section B
- Any additional question (s) answered will not be marked
- All necessary calculations must be done in the answer booklet provided. Therefore, no paper should be given for rough work
- Graph paper is provided
- Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used

SECTION A: (40 MARKS)

*Answer **all** questions in this section*

1. Given that $p \Delta r = 4r^2 - 2p$, evaluate $(4 \Delta^- 1) \Delta 3$ (04 marks)

2. Make f the subject of the formula;

$$\left(\frac{f-m}{f+m}\right)^{1/3} = Z$$ (04 marks)

3. An angle of depression from the top of a pole to a car on a horizontal ground is 50°. The height of the pole is 30m. Find the distance of the car from the foot of the pole.   (04 marks)

4. Solve the equation; $x - 12 = \frac{-35}{x}$ (04 marks)

5. Under an enlargement scale factor -1, B (4, 3) maps onto B^1 (4, -5). Find the coordinates of the centre of enlargement.   (04 marks)

6. Find the area of a triangle ABC in which a = 4.2cm, c=7.5cm and <ABC =110°.   (04 marks)

7. 3 plates and 4 cups cost shs 380 and that of 4 plates and 5 cups cost shs. 110 more than sh. 380. Find the cost of each item.   (04 marks)

8. Given that M $=\begin{pmatrix} 3 & 2 \\ 5 & 4 \end{pmatrix}$ and N$=\begin{pmatrix} -3 & -1 \\ 6 & -2 \end{pmatrix}$. Find the inverse of (M+N). (04 marks)

9. Solve the inequality; $\frac{x+7}{5} \le 1 + \frac{x+3}{6}$ and show your solution set on a number line.   (04 marks)

10. Opposite angles of a cyclic quadrilateral are such that one of them is thrice the other. Find the values of each of the angles.   (04 marks)

SECTIOB B: (60 MARKS)

*Answer any **five** questions from this section*

All questions carry equal marks

11. A group of tourists wish to travel a distance of not less than 600km. For x days they will travel by bus and y days will travel by taxi. Each day they can travel 300km by bus or travel 800km by tax. The tour must not exceed 14 days. Each day travelling by bus will cost shs. 7000 and each day travelling by taxi will cost shs. 14000. The tour must cost at most shs. 98000.

    (i)   Write down five inequalities representing above information.

    (ii)   Plot a graph for the inequalities by shading out the unwanted region.

    (iii)   Find how many days each type of vehicle should be used in order to minimize the cost of the tour.   (12 marks)

12. (a) If $\begin{pmatrix} 2x & 16 \\ 2 & x \end{pmatrix}$ is a singular matrix, find the possible values of x.   (03 marks)

    (b) Find the values of x and y from the matrix equation

    $$\begin{pmatrix} y & 4 & 2 \\ 3 & 1 & 4 \end{pmatrix}\begin{pmatrix} 3 \\ -4 \\ x \end{pmatrix} = \begin{pmatrix} 4 \\ x+8 \end{pmatrix}$$ (04 marks)

    (c) Solve the following pair of simultaneous equations using matrix method.

    $2x = 7 + 3y$ and $3y + 4x = 5$.   (05 marks)

13. If a triangle XYZ with vertices X (3,1) Y (7,1) and Z (3,4) is mapped on X'Y'Z' by the transformation matrix $\begin{pmatrix} 3 & 2 \\ 1 & 1 \end{pmatrix}$ then X'Y'Z' is mapped onto X"Y"Z" by the transformation matrix. $\begin{pmatrix} -1 & 1 \\ 0 & 2 \end{pmatrix}$. Find;

    (a)   The coordinates of

        (i)   X', Y' and Z'

        (ii)   X", Y" and Z"

    (b)   Find a single matrix that would map X"Y"Z" back onto XYZ.

    (c)   Find the area of X"Y"Z".   (12 marks)

14. In Kayunga Christian High School, the marks obtained by 45 students in a mathematics mock exam were as follows.

77	54	32	66	88	66	45	84	64
64	25	76	87	67	49	31	58	41
52	69	54	97	75	71	42	74	70
63	50	65	46	56	58	47	54	68
22	64	53	53	57	77	45	49	15

    (a) (i)   Construct a grouped frequency distribution table starting with 11 – 20.

        (ii)   Calculate the mean mark using 50.5 as assumed mean.

    (b) Construct a cumulative frequency curve and use it to estimate the number of students who scored between 40 and 75 marks.   (12 marks)

15. (a)   On the same axes draw graphs $y = 4 - 3x + x^2$ and $y = 2x$ for $-3 \le x \le 5$.

    (b)   Use your graph to solve the equation $x^2 – 5x +4 = 0$ (12 marks)

16.   Town B is 55km from town A on a bearing of 050^0. A third town C lies 75km due south of B. Given that town D lies on a bearing of 255^0 from C and 170^0 from A, make an accurate scale drawing to show the positions of the four towns. (Use a scale of 1cm to represent 10km)

   From this find;

   (a)   The distance of AD and DC in km
   (b)   The distance and bearing of B from D
   (c)   The bearing of C from A.   (12 marks)

17. Construct without using a protractor triangle ABC so that BC= 10cm, $<$ABC = 60° and $<$BCA = 45°

   (a)   On the diagram, measure length of AC

   (b)   Circumscribe triangle ABC

   (c)   Construct the locus of a set of points which are equidistance from A and B.

         Hence mark a point P such that APB = 45° and AP =PB.   (12 marks)

END