PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KILOLO DISTRICT COUNCIL

FORM FOUR JOINT PRE- MOCK EXAMINATION

BASIC MATHEMATICS

(For Both School and Private Candidates)

TIME: 3 Hours **APRIL, 2025**

Instructions

1. This paper consists of sections **A** and **B** with a total of **fourteen (14)** questions
2. Answer all questions from both sections
3. Section **A** carries sixty **(60)** marks and section **B** carries **forty (40)** marks
4. Non – programmable calculators are allowed in the examination room
5. Cellular phones and any unauthorized material are **not** allowed in the examination room
6. Remember to write your **Examination Number** on every page of your answer sheet(s)

SECTION A. (60 MARKS)
Answer all questions in this section

1. (a)The sum of lowest common multiple and greatest common factor of two numbers is 1260 and their lowest multiple is 900 more than their greatest common factor. Find the product of the two numbers.

   (b) A lorry is carrying kilograms of maize, sorghum and simsim. $\frac{1}{3}$ of the kilograms are maize and $\frac{1}{4}$ of the kilograms are sorghum.
   If there are 250 kilograms of smsim, find

   (i) The total number of kilograms a lorry carrying
   (ii) The number of kilograms of maize and sorghum

2. (a) Find the value of x and y given that $x^{2y+1} = x^{3y-1} = 243$
   (b) Rationalize the denominator: $\frac{12}{\sqrt{6}} + \frac{10}{\sqrt{10}}$

3. (a) In a survey of 78 students of a class A, the ratio of the number of students who like mathematics to the number of students who like physics is 3:4. If 15 students do not like both the subjects and 35 students like both subjects. Find the number of students who prefer mathematics only.

   (b) A family has three children. Find the probability that
   (i) All the boys
   (ii) At most two are girls

4. (a) A line L_1 has the equation $x + 2y = 4$, the line L_2 is perpendicular to L_1 and passed through the origin. Determine the equation of L_2
   (b) Given vector $a = 6i - 2j,\ b = 2i + j\ and\ c = 3i - 5j$. Find the value of scalars t and k if $ta + kb = 4i - 3j$

5. (a)Prove that the length of one side of a regular hexagon inscribed in a circle is equal to half of the diameter of circle
   (b) A kite has an area of 12cm^2. If it's longer diagonal is 5cm longer than the shortest diagonal. Find the length of the shortest diagonal

6. (a) A patient went to buy medicine to the pharmacy nearby his home, a doctor provided him 45 tablets each weighing $\frac{3}{4}$ gram which is in the bottle, if the empty bottle weighs 115 gram. What was the total weight? (Give your answer in kg)
   (b) Mr. Richard has enough food to feed 40dogs for 80 days. If he sells 8 dogs how long would the food last?

7. Ngojea purchased two exercise books for 720 Tsh each. She sold these exercise books, gaining 6% on one and losing 4% on the other. Find her gain or loss percent in the whole transaction.
   (b) Use the following information to prepare an income statement for the year ended 31st December 2023.

   Gorss profit ……Tsh 880, 000
   Electricity …… Tsh 220,000
   Printing ……. Tsh 360,000
   General expenses …….. Tsh 290,000
   Salary ……. Tsh 340, 000
   Interest received …… Tsh 120,000

8. (a) Onyango decides to save money in a bank which gives a good interest. In the first month he saved 22,000 Tsh and 42,000 Tsh in the second month, 62, 000Tsh in the third month and an extra of 20,000Tsh. Determine the total amount of money saved after two years.
   (b) The sum of infinity of a Geometric progression (GP) is 99. Find its first term if the common ration is $\frac{3}{4}$

9. (a) Given tan $tan\ Q = \sqrt{3},\ find\ the\ value\ of\ \frac{\cos cos\ Q - 2\tan tan\ Q}{\sin sin\ Q + 2\cos cos\ Q}$
   (Leave your answer in form of$a + b\sqrt{c}$)
   (b) From the top of a cliff 200m height, the angles of depression of A and B on the ground and the opposite sides of the cliff are$60°\ and\ 30°$. Find the distance between A and B.

10. (a) Factorize the expression $A^2 - B^2$ and use the result to evaluate. $(1005)^2 - 995 \times 994$
    (b) When a numerator of a fraction is decreased by 1, its value becomes $\frac{2}{3}$, but when the denominator is increased by 5, its value become$\frac{1}{2}$. Find the original fraction.

SECTION B (40 Marks)
Answer all questions from this section

11. (a) The table below shows the distribution of the age of girls in one of the class at a certain school

Age in years	14 – 16	17 – 19	20 – 22	23 – 25	26 – 28
Number of girls	4	6	4	16	10

(i) Calculate the mean, hence interpret your results
(ii) Calculate the mode, hence interpret your results

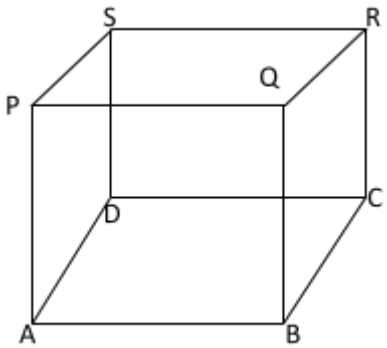
(b) Prove that, the angle at the centre of a circle is twice the angle at the circumference given that they are formed by the same arc

(c) Two chords, AB and CD of a circle whose radius is 13cm are equal and parallel. If each is 12cm long, find the distance between them if O is the centre of the circle.

12. (a) P and Q are points on the parallel of latitude 58.4°N, their longitudes being 148°W and 32° E respectivey. What is their distance apart?
(i) A long the parallel of latitude
(ii) A long a great circle
($Take\ 2\pi R = 40,000km$) Give your answers correct to 3 significance figures.

(b) A box has a rectangular base ABCD as shown in the figure below

$\overline{AB} = 3.2m\ \overline{BC} = 1.8m$
and $\overline{CR} = 2.4m$.



Determine

(i) The length of diagonal $\overline{AR}$

(ii) The angle between the diagonal $\overline{AR}$ and the base $ABCD$

(iii) Find the lateral surface area of a given figure above

13. (a) Given that$M = (3\ x\ x\ +\ 1\ 2\ )\ and\ N =\ (1\ 2\ 3\ 0\ )$, find the value of x for which MN is a singular matrix.

(b)Mr. Kawaganise bought 3 pens and 5 pencil for a total of Tanzania shillings 165. If Mr. Kawaganise bought 2 pens and 4 pencils he would have spent Tanzania shillings 45 less. Taking x to represent the price of a single pen and y to represent the price of s single pencil.

(i) Form two equation to represent the above information

(ii) Use matrix method to find the price of a single pen and that of a single pencil

(c) (i) What is the image of point $R(-\ 2,\ 3)$ under the transformation matrix $(1\ 0\ 0\ \ -\ 1\ )$

(ii) State the axis in which point R is reflected

14. (a) On the same axes, draw the graph of $y = x^2 - 5x\ and\ y = 5x - x^2$ for values of x from $-\ 1\ to\ 6$

(i) At what points do the curves intersect?

(ii) Write down the equations of two lines of symmetry of the completed curves.

(b) With only 20,000 shillings to spend on fish, Mwanuke had the choice of buying two types of fish. The price of a single fish of type 1 was 2500 shillings and each fish of type 2 was sold at 2000shillings. He wanted to buy at least four of type 1. What was the greatest number of fish that Mwanuke bought? How many of each type could he buy?