PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
SINGIDA MUNICIPAL COUNCIL
FORM FOUR PRE- NATIONAL EXAMINATION
BASIC MATHEMATICS

Time: 3Hours August 2023

Instructions

1. This paper consists of two sections A and B with a total of fourteen (14) questions
2. Answer all questions in both sections
3. All necessary works and answers for each question done must be shown clearly
4. Non-programmable calculator, graph papers and Mathematical tables may be used
5. Cellular phones and other unauthorized materials are not allowed in the examination room
6. The following are constant can be used: -

$\pi = 3.14$
R = 6370km

SECTION A (60 Marks)

1. (a) By the year 2022 the population of Tanzania is expected to be 61,741,120. Write this population in standard notation corrects to two significant figures.
   (b) A shopkeeper sells chocolate packets that contain 15 chocolate and biscuit packets that contain 9 biscuits. What is the least number of chocolates and biscuits Aisha should buy so that there will be one biscuit for every chocolate?
2. (a) If $x = y$, find x
   (b) Express $\frac{2\sqrt{5}}{\sqrt{5}+\sqrt{3}}$ in form of $a + b\sqrt{c}$
   (c) If $3m - n = 4$, what is the value of $\frac{27^m}{3^n}$
3. (a) In a class of 60 students, some are football fans and some are long jump fans.If 40 are football fans, 25 are long jump fans while 2 are neither football fans nor long jump fans, how many are both football fans and long jump fans?
   (b) A box contains three green marbles, five blue marbles and two red marbles. A marble is taken out at random its colour noted and then returned into the box after noting its colour. Using tree diagrams, determine the probability that the two marbles will of the same colour.
4. (a) Find the equation of the line passing through a point (6, - 4) and is parallel to the line whose equation
   is 12x +6x −9 = 0. Write your answer in form $\frac{x}{a} + \frac{y}{b} = 1$
   (b) Given that $\underline{a} = \underline{i} - 4\underline{j}$ and $\underline{b} = -5\underline{j}$, find
      (i) vector $\underline{c}$ if $\underline{c} = -2\underline{a} + 3\underline{b}$
      (ii) magnitude of vector $\underline{c}$
5. (a) The sides of triangle are 8 cm, 10 cm and 12 cm. If the longest side of a similar triangle is 36 cm, find the length of the other sides.
   (b) A woman owns a square plot of land 112.5m long. She wants to plant trees in the entire plot. Each tree requires $6.25m^2$ of land. How many trees can she plant?
6. (a) In a camp of 300 soldiers had food for 13 days. If 40 of them are transferred to other camp. So how long the food Last?
   (b) A piece of string whose length is 8.54 cm, is cut from x cm long. If the remaining part of the string is
   divided into equal parts of length 6 cm, there will be 20 pieces. What is the length of the string?
7. (a) The price of watch including 10% VAT is 825/=. What is its basic price?
   (b) Using the details below

Opening stock 3,000,000/=
Closing stock 2,000,000/=
Net purchases 20,000,000/=
General expenses 50% of opening stock
Calculate

(i) Average stock
(ii) Cost of sales
(iii) General expenses

8. (a) Bakari has 55 blocks. He decides to stack up all the blocks so that each row has one less block than the row below. He wants to end up with just 1 block on top. How many should he put in the bottom row?

(b) The amount of Tsh. 843 000 was collected after investing a certain amount of money at a rate of 10% compounded semi-annually for 3 years. What was the initial principal invested?

9. (a)Without using a table, find the value of $\frac{\tan tan\,(300°)}{\sin sin\,(150°)\,\cos cos\,(315°)}$

(b) From the top of a building 75 m high, John sees a lorry and a minibus along the road, both being on one side of the building at the angles of depression of 30^0 and 60^0 respectively. Determine the distance between the cards, leaving the answer in sud form

10. (a) Express the equation $2t^{-10} - 3t^{-5} + 1 = 0$ in term of x where $x = \frac{1}{t^5}$, hence solve the values of x.

(b) From the equation $\frac{3x-y}{x+3y} = 2$, find $\frac{x}{y}$

SECTION B (40 Marks)

11. 100 students were given a test by their Basic Mathematics teacher and they obtained the following scores. Students who get 40 – 49 were 7, 50 – 59 were 13, 60 – 69 were 36, 70 – 79 were 30, 80 – 89 were y and 90 – 99 were 4. From the obtained data above, answer the following questions

(i) Determine the value of y
(ii) By using assumed A=74.5, determine mean
(iii) Calculate mode

12. (a) A ship sail for 120 knots from town A $(60°N, 5°E)$ to town B$(60°N, 5°W)$ on Monday at 7:00A.m, when will it reach town B.

(b) A right pyramid has sides of the base 6cm by 8cm and slant height 13cm, now

i. Sketch the right pyramid showing the above information
ii. Determine the height of the pyramid
iii. Determine the angle between the base and the slant edge
iv. Determine the volume of the pyramid

13. (a) Solve for x given that $(4x + 7\ 2x + 1\ 5x + 2\ 3x - 2)$ cannot be used to solve simultaneous equation

(b) The sum of two numbers is 30. The difference between the larger number and three times the smaller number is 2. Find the two numbers by using inverse of matrix

(c) A point (x, y) is reflected on the line y = x followed by a rotation through an angle of 180° clockwise about the origin. Find the image of (2,3) under this double transformation.

14. (a) In a certain garage the manager had the following facts floor space required for a saloon is $2m^2$ and for a lorry is $3m^2$. Four technicians are required to service a saloon car and three technicians for a lorry per day. He has a maximum of $24m^2$ of a floor space and a maximum of 36 technicians available; in addition, he is not allowed to service more Lorries than saloon cars. The profit for serving a saloon car is 40,000/= and a lorry is 60,000/=. How many motor-vehicles of each type should be serviced daily in order to maximize the profit?

(b) The maximum value of function $f(x) = h - 4x - x^2$ is 6. Find the value of h.