TANZANIA HEADS OF ISLAMIC SCHOOLS COUNCIL

FORM FOUR INTER ISLAMIC MOCK EXAMINATION

041 **BASIC MATHEMATICS**

(For both School and Private Candidates)

TIME: 3 HOURS **Tuesday, 19th August 2025 a.m.**

Instructions

1. This paper consists of **two (2)** sections, A and B.
2. Answer **all** questions from sections A and B.
3. All necessary workings and answers for each question must be shown clearly.
4. NECTA mathematical table, and non-programmable calculators may be used.
5. All writings should be in blue or black ink, while drawings should be in pencil.
6. All communication devices and any unauthorized materials are **not** allowed in the examination room.
7. Write your **Examination Number** on every page of your answer booklet(s) provided.

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SECTION A (60 Marks)

Answer **all** questions in this section

1. (a) A shopkeeper measured a mass of $0.\dot{3}\dot{6}$ kg of sugar. Express the mass in terms of:
   (i) Fraction
   (ii) Percentage

   (b) Express 0.03785 correct to:
   (i) 3 significant figures
   (ii) 3 decimal places
   (iii) Standard notation

2. (a) Given that $V = \sqrt{\frac{3u(u-a)}{2}}$. Make "a" the subject of the formula.

   (b) Express $\frac{\sqrt{3}}{2-\sqrt{3}}$ in the form of $a + b\sqrt{c}$ where a, b, and c are integers.

   (c) Given that, $Log_{10}x = \bar{1}.413$, find the value of $log_{10}\sqrt{x}$.

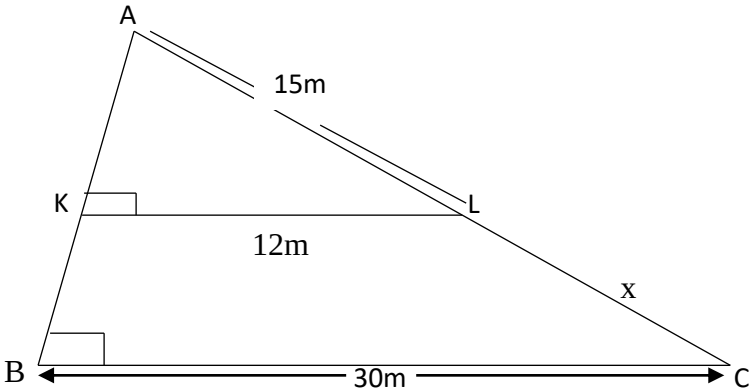
3. (a) In a class of 30 students, 15 liked Mathematics, 18 liked English, and 4 liked neither Mathematics nor English. Use the formula to find the number of students who like both Mathematics and English.

   (b) A card is selected at random from a pack of playing cards. Find the probability that the card is an ace or a black card.

4. (a) Point P lies on the x-axis and is equidistant from point R(8,4) and Q(6,6). Find the coordinate of P.

   (b) Given $\underline{a} = (4, -3)$ and $\underline{b} = (-2, 1)$; find the unit vector in the direction of $3\underline{a} - 2\underline{b}$.

5. (a) Find the length marked by the letter "x" in the following figure:



   (b) The perimeter of a regular octagon inscribed in a circle is 88cm. Find the radius of the circle.

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6. (a) If 12 men can build a house in 15 days. How many days will 20 men take to build the same house working at the same rate?

   (b) Haroun is paid Tshs 1800 per hour. How much is he paid after working for 336 minutes?

7. (a) A shopkeeper mixes 3kg of groundnuts worth Tsh 3000 per kg with 2kg of cashew nuts worth Tsh 5000 per kg.
   (i) What is the cost price per kg of the mixture?
   (ii) If he sells the mixture at Tsh 4200 per kg, does he make a profit or a loss? What is the percentage?

   (b) Given the following information related to the ABC business

Stock	01/01/2024	40,000/=
	31/12/2024	60,000/=
Purchases		105,000/=
Sales		160,000/=

   Calculate:
   (i) The cost of goods sold.
   (ii) The average stock.
   (iii) Gross profit.

8. (a) The arithmetic mean of the numbers is 15, and the geometric mean of the same numbers is 9. Find the numbers.

   (b) How much should Zaina deposit in a bank at 10% compounded quarterly in 5 years in order to get a total amount of 60,000/=?

9. (a) The triangle ABC has sides 9cm, 12cm, and 15cm.
   (i) Prove it is right-angled.
   (ii) Find the area of a triangle using trigonometry.

   (b) A boat is 220m away from a lighthouse, which is 40m high. Find the angle of depression of the boat as seen from the top of the lighthouse.

10. (a) Solve for the value of x : $\frac{x-3}{x+2} = \frac{x+1}{x-4}$.

    (b) Abdallah owns 21 domestic animals. Each of his domestic animals is either a goat or a chicken. Suppose the domestic animals have a total of 76 legs. Find the number of goats and the number of chickens that he owns.

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SECTION B (40 Marks)

Answer **all** questions in this section

11. (a) The doctor at Muhimbili Referral Hospital recorded the weight of patients as follows:

Weight	15 – 20	21 – 26	27 – 32	33 – 38	39 – 44	45 – 50
Number of patients	4	6	14	6	2	8

(i) By using the Assumed Mean of 29.5, determine the mean.
(ii) Determine the value of the mode.
(iii) Determine the value of the median.

(b) A pendulum of length 26cm moves through an angle of 26°. What is the length of an arc made by its tip in one swing?

12. (a) Two towns, A and B, are located at (10°S, 38°E) and (10°S, 43°E) respectively:
(i) Find the distance between two towns in kilometers.
(ii) Suppose a ship is sailing at 50km/hr from town A to town B. Using the answer obtained in part a (i) above, find how long the ship will take to reach town B.

(b) VABCD is a right pyramid with VA = VB = VC = VD = 5cm, and ABCD is a square with base 4cm at point N. Find:
(i) The angle that VA makes with the base.
(ii) The height of the pyramid.

13. (a) If $A = \begin{bmatrix} 3 & 5 \\ 4 & -2 \end{bmatrix}$. Find $A^2 + 2A$.

(b) Find the value of x $if\ p = \begin{bmatrix} x & -3 \\ x & x \end{bmatrix}$ has $|p| = -2$.

(c) A transformation T takes every point (x, y) into (x′, y′) such that x′= 2+x and y′= y. Find:
(i) The value of T.
(ii) The image of (-3,4) under T, then followed by reflection in the line y-x = 0.

14. (a) Given that $h(x) = ax^2 + 4x$. Find:
(i) The value of "a" if h(-1) = 3.
(ii) The domain and range of h(x).

(b) A company produces batteries A and B. Each A needs 3 hours on machine I and 2 hours on machine II. B needs 4 hours on machine I and 1 hour on machine II. Machine I is available in 120 hours, and machine II is available in 50 hours. If battery A earns a profit of 10,000 shs and machine B earns a profit of 12,000 shs. Find the maximum profit.

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