THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
FORM TWO NATIONAL ASSESSMENT

042 **ADDITIONAL MATHEMATICS**

Time: 2:30 Hours **Year: 2022**

Instructions

1. This paper consists of ten **(10) Compulsory** questions**.** Each question carries 10 marks.
2. Answer **all** questions.
3. All writing must be in **blue** or **black** ink **except** drawing which must be in pencil.
4. Cellular phones, and any unathorized materials are **not** allowed in the assessmenmt room.
5. Write your **Assessment Number** at the top right hand corner of every page.

FOR ASSESSOR'S USE ONLY		
QUESTION NUMBER	**SCORE**	**ASSESSOR'S INITIALS**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

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1. (a) Determine the first 5 prime numbers of Fibonacci sequence

(b) (i) Find the next four numbers in the following sequence

$1, 4, 10, 22, \ldots\ldots, \ldots\ldots, \ldots\ldots, \ldots\ldots$

(c) (ii) Use divisibility rule whether 9142 is divisible by 5, 6, 7, and 9 or not.

2. (a) Given that $\frac{A}{b} = \sqrt{\frac{(f+p)}{(f-p)}}$, express f interms of A, b and p

(b) use elimination method to solve the following simultaneous equation:

$$\begin{cases} \frac{p}{5} + \frac{2q}{3} = \frac{49}{5} \\ \frac{3p}{7} - \frac{q}{2} + \frac{5}{7} = 0 \end{cases}$$

3. (a) The sum of interior angles of a regular polygon is 1440^0 . Determine:

(i) the number of sides of the polygon.

(ii) the name of the polygon.

(iii) the maximum number of triangles that can be formed from the polygon.

(b) If the exterior angle of a regular polygon is 30^0 less than a half of the interior angle, calculate:

(i) the size of the interior angle.

(ii) the size of the exterior angle.

(iii) the number of angles of regular polygon.

4. (a) A point $Q(x, y)$ moves in such a way that its distance from the point $B(3,4)$ is twice its distance from the line $x = 3$. Find the locus of the point $Q(x, y)$.

(b) A point $P(x, y)$ moves in such a way that its distance from the point $S(2,-3)$ is equal to its distance from the point of intersection of the lines whose equations are $x-2y=4$ and $2x+3y=15$.

5. (a) Three $A(8,10)$, $B(5,n)$ $C(0,2)$ and points are collinear. Find the value of n.

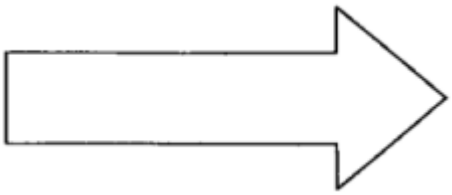
(b) A line passing through the point $A(4,6)$ crosses y-axis at B. If the line is parallel to another line whose equation is $2y = x - 2$, determine the coordinates of point B.

6. (a) draw and state the number of line(s) of symmetry for each of the following figures:

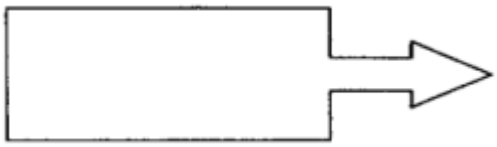
(i)



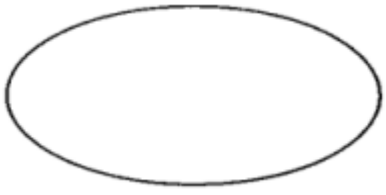
(ii)



(iii)



(iv)



(b) State the order of rotational symmetry for each of the following polygons:

(i) Circle

(ii) Equilateral triangle

(iii) Rectangle

(iv) Square

7. (a) Construct a truth table for each of the following propositions:

(i) $(p \wedge q) \rightarrow (p \vee q)$

(ii) $(\neg p \wedge (p \rightarrow q) \rightarrow \neg q)$

(b) Use a truth table to test the validity of the argument "If it rains or no one comes, the game will not take place. The game was a success. Therefore, it did not rain".

8. (a) Quantity x is jointly proportional to the quantity y and the reciprocal of quantity z . If $x = 3$ where $y = 2$ and $z = 1$,

(i) Write down the equation connecting x , y and z

(ii) Determine the value of z , where $x = 6$ and $y = 20$.

(b) Twelve men working for 10 hours per day take 4 weeks to plant maize in a certain farm. For how long should 20 men work per day in order to plant maize in the same farm for 14 weeks ?

9. Draw the graph of $y = x^2 - 7x + 18$ and $y = x - 2$ for $-1 \leq x \leq 6$ on the same xy-plane, in the following graphical space.Hence use the obtained graph to find the common solution of the given equations.

10. In a class of 63 students, 22 students study Biology, 26 study Chemistry, 25 study Physics, 18 study both Physics and Chemistry, 4 study both Biology and Chemistry, 3 study both Physics and Biology and 1 student studies all the three subjects.

    a) Represent this information using a Venn diagram.

b) Use the results of part (a) to determine the number of students who study:

(i) Biology only.

(ii) Physics or Chemistry.

(iii) None of the three subjects.

(iv) Physics but not Chemistry.