THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT



FORM FOUR SPECIAL SCHOOLS SYNDICATE JOINT EXAMINATION, 2022

041 **BASIC MATHEMATICS**

Time: 3:00 Hrs **Tuesday 20-September-2022 AM**

INSTRUCTIONS.

1. This paper consists of sections A and B with a total of fourteen (14) questions.
2. Answer **all** questions.
3. Each question in section A carries six (06) marks while each question in section B carries ten (10) marks.
4. All necessary working and answers for each question must be shown clearly.
5. NECTA mathematical tables and non-programmable calculators may be used.
6. Write your Examination Number on every page of your answer booklet(s).

SECTION A (60 Marks)

Answer **all** questions in this section

1. (a) Pineapples are to be exactly divided into groups of 56, 65 and 68. What is the minimum number of pineapples required?

   (b) Tanzania received 8,000,000,000 Tshs from IMF. 45 percent of the money was spent to build several hospitals to various regions and 20 percent of the remaining money to build new secondary schools. How much money remained?

2. (a) Solve for y if $(\log_3 y)^2 - \log y^{\frac{1}{2}} = 1.5$

   (b) If $\frac{\sqrt{2}}{3+\sqrt{2}} = \frac{p\sqrt{q}-r}{s}$, find the value of p, q, r and s.

   (c) Solve the equation $\frac{4^{x-5}}{6^{2y-3}} = 3456$

3. In a company of 360 workers, some drink avocado juice as their breakfast and some mango juice. If 164 drink avocado juice, 130 drink mango juice and 124 drink both avocado juice and mango juice. Find;

   i. The number of workers in the company who drink neither avocado juice nor mango juice.

   ii. The probability that there might be workers who drink avocado juice only.

4. (a) Find the coordinate of point P on the $y-axis$ which has the same distance from point $Q(3,4)$ and $P(1,-3)$.

   (b) Given that $\underset{\sim}{a} = (3,4)$, $\underset{\sim}{b} = (1,-4)$ and $\underset{\sim}{c} = (5,2)$. If $d = \underset{\sim}{a} + 4\underset{\sim}{b} - 2\underset{\sim}{c}$, determine;

   i. The magnitude of d

   ii. The direction cosines of d

5. (a) Triangle ABC is such that $\overline{AB} = \overline{AC}$ and $\overline{AB} : \overline{BC} = 3:4$, If the perimeter of triangle is $60m$, calculate the value of BC

   (b) Find the area of square whose it's diagonals have length of $12.5cm$.

6. (a) The number of tablets given to a patient was found to be direct proportional to the weight of the patient. If a patient with 72kg was given 18 tablets, find how many tablets would be given to a patient whose weight is 48kg.

(b) Yombo receive Ushs, 6, 500,000/= from his boss in Uganda. How much did he get in Tanzania currency (Tshs), if one Ugandan shilling was equivalent to 0.65 Tanzania shilling?

7. (a) Nyonyoma paid 1,800,000 for a desktop computer and sold it the following year for 1,440,000 Tshs. Find;
   i. The loss made
   ii. The percentage loss

   (b) The following information relates to Mr.Lucky, a trader, as at 31st August 2022.

   Sales…….3,40,000/=

   Cost of sales……. 75% of sales

   Opening stock …….90,000/=

   Gross profit ……. 20% of sales

   Closing stock …….. 20% of cost of goods sold

   Calculate;

   i. Purchases
   ii. Cost of sales
   iii. Closing stock

8. (a) The sum of the first 20 terms of an Arithmetic Progression (A.P) is 65. Find the common difference of this A.P if the first term is 7.
   (b) A ball falls a height of 3.2 m, if after each fall it renounce three quarter the distance it has fallen, how far the ball travel in renouncing five times?

9. (a) Rachael is 30m from a flag pole installed with it's bottom end some distance below the ground level. The angle of elevation of the top of flag pole from Rachael's eye level is $12.4°$ and the angle of depression of it's bottom end is $2.1°$.

   i. Sketch the diagram to represent this information
   ii. Calculate the height of the pole

   (b) If $Cosp = \frac{2}{3}$ and $Sinq = \frac{5}{7}$, where p and q are acute angles, evaluate the following without using mathematical table or calculator.

   i. $Cos(p+q)$
   ii. $Sin(p+q)$

10.(a) Jesca bought a certain number of mangoes for 3,600/=. If each mango had cost 50/= less she could have bought six more mangoes for the same amount of money. How many mangoes did she buy?

(b) Factorize $a^2 - b^2$ and the evaluate $(1005)^2 - 995 \times 994$

SECTION B (40 Marks)

Answer **all** questions in this section

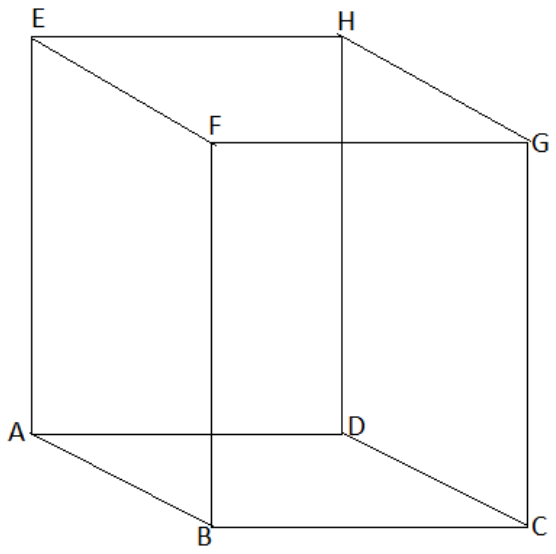
11. In a certain school, the scores of 24 students in one of the Chemistry test were as follows;

49, 64, 38, 46, 60, 68, 46, 42, 62, 38, 68, 57, 63, 76, 72, 73, 51, 55, 66, 63, 58, 47, 59 and 54

(a) Summarize the above data in a frequency distribution table using class size 5 and lowest limit of 35.
(b) By using Assumed mean, $A = 57$. Find the mean score (Give your answer to two significant figures).
(c) Determine the score obtained by many students (Write your answer in two significant figures)

12. (a) A ship sailed from Madagascar ($52°S, 68°E$) to Zanzibar ($42°S, 68°E$). If it leaves Madagascar at 07:30 am and arrived in Zanzibar at 09:30 pm, Use $\pi = 22/7$ and $R = 6370$ km to find the speed of the ship in Km/hr.

(b) The figures below shows a right prism with lengths indicated in centimeters.



Find;

i. The length of diagonal $\overline{FD}$. Use aid of diagram in your solution

ii. The angle between the diagonal $\overline{BH}$ and plane ADHE. Use aid of diagram in your solution

(c) The volume of a square pyramid is $112.8cm^3$. If the sides of it's base are $4cm$ long, find the height of the pyramid correct to one decimal place.

13. (a) Alli, Neema and Sauda are students in form four class, Alli has 6 textbooks and 5 pencils, Neema has 7 counter books and 9 text books, Sauda has 10 counter books and 3 pens.

i. Express this information in matrix form

ii. State the order of the matrix

(b) Transformation is given by $x' = 4y$, $y' = 2x - 3y$. Find the image of the point $(2+a,\ 3-b)$ under this transformation.

(c) Given $A = \begin{pmatrix} 1 & y \\ x & 5 \end{pmatrix}$, $B = \begin{pmatrix} -5 & 3 \\ 2 & 1 \end{pmatrix}$, Find x and y if matrix B is an inverse of A.

14. (a) Given that $f(x) = x^2 - 3x + 2$. Find;

i. $f^{-1}(x)$

ii. Turning point of $f(x)$

iii. Range of $f(x)$

(b) A nutritionist prescribes a special diet for patients containing the following number of vitamin A and B per kg of two food types C and D.

Food Types	Vitamin A	Vitamin B
C	20	7
D	15	14

If the minimum daily intake required is 120 units of Vitamin A and 70 units of Vitamin B, what is the least total mass of food a patient must have so as to have enough of these vitamins?