2022

EXAMINATION SERIES FOR SECONDARY SCHOOLS

FORM FOUR

B/MATH

QUESTIONS AND ANSWERS

TABLE OF CONTENT

INTRODUCTION

This paper consists of Basic Mathematics series of examinations (for form four students). All exams have been composed based on the current recommend format from National Examination Council of Tanzania (NECTA) for the year of 2022. Some exams have been collected and reorganized from regional mock exams conducted in the year of 2020 and 2021.

The paper Aim to exposure students to variety of questions and how to attempt questions properly. Also, will help students to adapt new format as recommended by NECTA toward their final examination.

Not only students but also teachers can use it as teaching and learning material during their teachings.

ACKNOWLEDGEMENT

First and foremost, we would like to **praise and thank God**, **the Almighty**, who has granted countless blessing, knowledge, and opportunity to the **Tzshule Team**, so that we have been finally able to accomplish the work.

Secondly, we would like to thank CEO & Founder of Tzshule (**Mr. George Ramadhani**) for not giving up on his dream of developing and providing educational materials electronically throughout the country.

We'd also like to thank all **Tzshule Users** for your support and positive feedback, since it motivates and encourage us to do more and more in developing educational materials.

- GOD MAY BLESS YOU ALL -

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Our motto:

"Quality education, for future Generation"

QUESTIONS

SERIES #1

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #01

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

Instructions

1. This paper consists of section A and B with a total of fourteen (14) questions
2. Answer all questions in sections A and B, each question in section A carries six (6) marks while each question in section B carries ten (10) marks
3. NECTA Mathematical tables may be used
4. Cellular phones, calculators and any unauthorized materials are not allowed in the examination room
5. Write your examination number on every page of your answer sheet (s)

SECTION A (60 MARKS)

Answer **all questions** in this section

1. (a) Simplify $\frac{0.3754 \ x \ 17.58}{0.00042 \ x \ 9.33}$ without using mathematical table express your answer in four significant figures.

   (b) Jenk and Jemry are riding on a circular path. Jenk completes a round in 24 minutes where as Jemry completes a round in 36 minutes. If they started at the same place and time and go in the same direction, after how many minutes will they meet again at the starting point?

2. (a) Use mathematical table to evaluate $\frac{73 \ x \ 13.1}{0.029 \ x \ 0.67^2}$

   (b) Find the value of x and y if $\frac{3^{x+2}}{5^{2y-8}}$ = 2025

3. (a) Let U be a universal set and A and B be the subsets of U where $U = \{a, b, c, d, e, f, g, h\}$, $A = \{c, g, f\}$ and $B = \{b, d, h\}$.

   i) Find the number of subsets of set A'

   ii) Find $n(A' \cap B)$

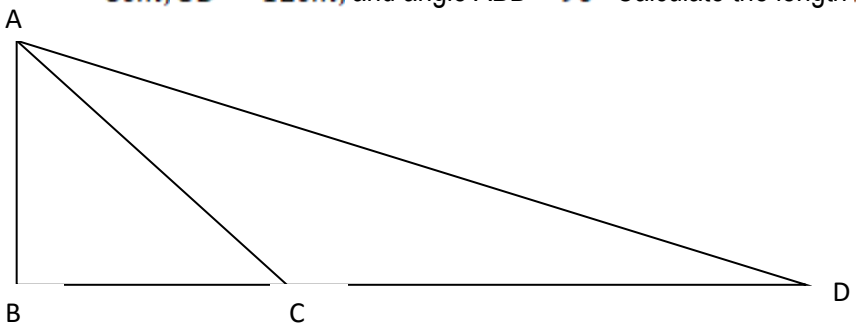
   iii) If an element is picked at random from the universal set (u), find the probability that it is an element of set B

   (b) Find the probability that a king appears in drawing single card from an Ordinary deck of 52 cards

4. (a) The coordinate of P, Q and R are (2, m), (-3, 1) and (6, n) respectively. If the length of PQ is $5\sqrt{2}$ units and midpoint of QR is $\left(\frac{3}{2}, -1\right)$ find the possible value of m and n

   (b)The gradient of line L_1 is -2. Another line L_2 is perpendicular to L_1 and passes through (-3,-2). What is the equation of L_2

5. (a) if $\overline{AC} = 17cm$, $\overline{BC} = 8cm, \overline{CD} = 12cm,$ and angle ABD = 90^0 Calculate the length $\overline{AD}$



   (b) (i) Given $\frac{\overline{AB}}{\overline{KL}} = \frac{\overline{BT}}{\overline{LC}} = \frac{\overline{TA}}{\overline{CK}} = 3$ where $\overline{AB}, \overline{BT}$ and $\overline{TA}$ are the sides of the triangle ABT and $\overline{KL}, \overline{LC}$ and $\overline{CK}$ are the sides of the triangle KLC. What does this Information imply?

(ii) A regular Hexagon is inscribed in a circle if the perimeter of the hexagon Is 42cm, find the radius of the circle and its Area

6. (a) If **y** varies inversely as $\sqrt{x}$, and x is multiplied by **n**. What is the ratio of the first **y** to the second **y**?

(b) The headmaster has enough food to last for his 600 students for 20 days from tomorrow. If 120 students leave the school today for UMISSETA game, how long will the food last?

7. (a) By selling an article at shs 22,500/= a shopkeeper makes loss of 10%. At what price must the shopkeeper sell the article in order to get a profit of 10%?

(b) The following trial balance was extracted from the books of Nzilandodo on 31st December 2005.

TX MARKET LTD

TRIAL BALANCE AS AT 31.12.2005

DETAILS	DR	CR
Capital		15000/=
Drawings	2410/=	
Purchases	44280/=	
Sales		69470/=
Returns inward	1200/=	
Returns outward		980/=
Furniture	2000/=	
Motor vehicle	5000/=	
Carriage inward	14880/=	
Rent	1920/=	
Insurance	370/=	
Stock, January	850/=	
Carriage outward	6290/=	
Advertising	380/=	
Cash in bank	1210/=	
Cash in hand	2780/=	
Discount allowed	120/=	
Discount received	310/=	550/=
Debtors	6000/=	
Creditors		4000/=
	90000/=	90000/=

Note: Stock at close 31st December 7360. Required, prepare balance sheet as that date.

8. (a) The sum of the first six terms of an A.P is 72 and the second term is seven times the fifth term.
   i) Find the first term and the common difference
   ii) Find the sum of the first ten terms

(b) Find the sum of the first four terms of a geometric progression which has a first term of 1 and a common ratio of $^1/_4$

9. (a) If tan **A** = $\frac{-5}{12}$, where **A** is an obtuse angle,

Find (i). Cos **A** + Sin **A** (ii). – Cos² **A** – Sin² **A**

(b) A and B are two points on the ground level and both lie west of flagstaff. The angle of elevation of the top of the flagstaff from A is 56⁰ and from B is 43⁰. If B is 28m from the foot of the flagstaff. How far apart are the points A and B?

10. (a) Solve the quadratic equation $x^2 – 8x + 7 = 0$

(b) A field is 10m longer than its wide. The area is 7,200m². What is the width?

SECTION B (40 marks)

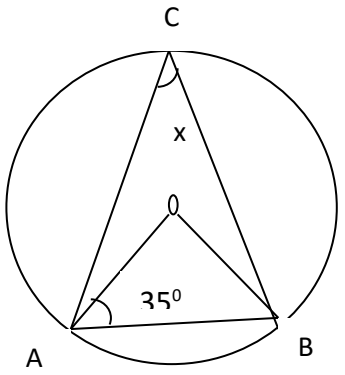
Answer all questions in this section

11. (a) Consider the following frequency distribution tale below;

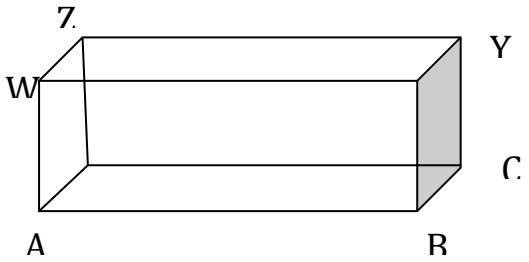
Marks	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	110-119
Freq	1	2	5	11	21	20	17	10	6	4	2	1

Draw the histogram and use it to estimate the mode in one decimal place.

b) Find the value of angle X in the figure below.



12. (a) A rectangular box with top WXYZ and base ABCD has AB=9cm, BC=12cm and WA = 3cm



Calculate (i) The length AC (ii) The angle between WC and AC

(b) Two places P and Q both on the parallel of latitude 26^0N differ in longitudes by 40^0 find the distance between them along their parallel of latitude.

13. (a) If matrix A is singular, what will be the value of y given that

$$\begin{pmatrix} 3 & y-1 \\ y+1 & 1 \end{pmatrix}$$

(b) Solve the following simultaneous equation by matrix method

2x + y = 7

4x+3y = 17

(c) Find the image of (3, 5) after rotation of 270° about the origin in anticlockwise direction.

14. (a) If f(x) is the function such that

$$f(x)=\begin{cases} -3 \ if \ x \leq -1 \\ 1 \ if -1 < x \leq 2 \\ 4 \ if \ 2 < x \end{cases}$$

i Sketch the graph of f(x)

ii State the domain and range of f(x)

(b) A transport company is hired to transport 420 people it has two types, P and Q of vehicle to be used. Type P carries 35 passengers and type Q carries 14 passengers. There are at least 10 vehicles of type Q and not more than 9 vehicles of type P. Write down inequalities to represent this information.

QUESTIONS

SERIES #2

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #02

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

INSTRUCTIONS

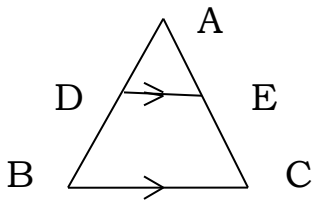
1. This paper consists of ten (**14**) compulsory questions.
2. This paper consists of sections **A** and **B**.
3. Mathematical table and non-programmable calculators may be used.
4. Cellular phones are not allowed.
5. Write your answers on the **special exercise book for examinations** and not on answer sheets
6. The following constants may be used
   (a) Radius of the Earth R = 6370km
   (b) $\Pi = \frac{22}{7}$

SECTION A (60 marks)

1. (a) Arrange the order of the digits in 289414 to make
   (i) The largest possible number (**1.5 *marks***)
   (ii) The smallest possible number (**1.5 *marks***)
   (b) Use a number line to get a solution; $^{(+)}7 - {}^{(+)}4$ (**3 *marks***)
2. (a) Find the value of X; $log_3(x + 16) - log_3 x = 2$ (**3 *marks***)
   (b) Find the value of P, If $\left(\frac{1}{64}\right)^{2+p} = 2^6$ (**3 *marks***)
3. (a) In a group of 240 tourists, 80 speak English, 120 speak French and 60 speak both English and French. How many speak neither English nor French. (Use Venn Diagram) (**2 *marks***)
   (b) A fair die and coin are tossed; show all possible results in a table and a tree diagram. (**4 *marks***)
4. (a) Find the equations of these lines
   (i) Gradient 4 and y-intercept -2 (**1.5 *marks***)
   (ii) Through (4,7) and (-2,10) (**1.5 *marks***)
   (b) Let a= 4i + 2j and b = 6i + 2j. Find $|a - 2b|$ (**3 *marks***)
5. (a) Determine the length of one side of regular polygon of interior angle of 144^0 when inscribed to the circle of a

radius of 10cm. (**3 *marks***)

(b) In a figure below DE// BC



(**3 *marks***)

Given that, AE=4dm, AB= 8dm, DE= 10dm. Find the value of BC.

7. (a) How many grams are there in 0.00912 tones (t) (**3 *marks***)

   (b) Solo, Theresia, Msuku and Mwanaidi can eat 2 bags of rice in 12 days. Each bag weghs 10kg. How many people can eat 6 bags of the same weight in 18 days. (**3 *marks***)

8. Kichan started business on 1st June 2011 with a capital of 100,000/= and made the following transactions:

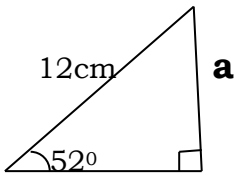
June 2:	Bought office furniture	40,000/=
7:	Bought goods	70,000/=
11:	Sold goods	65,000/=
16:	Paid Sundry Expenses	30,000/=
19:	Cash sales	80,000/=
24:	Paid wages	50,000/=

Required: Prepare Cash Account and Purchases Account at the end of the month. (**6 *marks***)

9. (a) Find the sum of the first 10 terms of the series, -1 + 2 – 4 + … (**4 *marks***)

   (b) If 2, **x**, 20 are terms of A.P. Find the value of **x**. (**2 *marks***)

10. (a) Find the value of **a**



(**2 *marks***)

   (b) In a triangle LMN, LM=6m,LN=5m and <MLN = 66^0. Find

   (i) the length MN(Use Cosine Rule) (**2 *marks***)

   (ii) the angle <N(Use Sine Rule) (**2 *marks***)

11. (a) Solve the equation $x^2 + 6x + 2 = 0$ by completing the square. (**3 *marks***)

   (b) Expand and simplify $(2x + 5)(2x - 5)$ (**3 *marks***)

SECTION B: (Marks 40%)

12. (a) The examination results of Form Three students at Loyola Secondary School are recorded for a group of students:

Marks (%)	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
Frequency	5	3	20	2	10

(i) Draw a histogram (**4 *marks***)

(ii) State the modal class (**1 *marks***)

(iii) Estimate the mode from 2(a) (**1 *marks***)

(b) Find the probability of choosing (i) a face card (**1.5 *marks***)

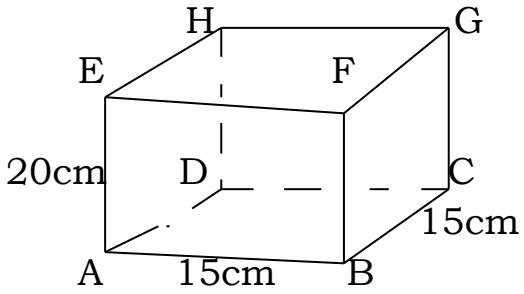
(ii) an ace card (**1.5 *marks***)

13. (a) The figure below represents a regular cuboids ABCDEFGH with AB=15cm,AE=20cm and AD= 15cm. Find the

(i) the length AG (**3 *marks***)

(ii) the angle between AG and the plane ABCD(**1.5 *marks***)

(iii) the volume of the cuboids. (**1.5 *marks***)



(b) Calculate the distance from Changwe (5^0S,39^0E) to Mangwe(2^0S,39^0E) in kilometers. Write the answer correct to one decimal place. (**4 *marks***)

14. (a) Find the value of y given that

$\begin{pmatrix} 2x & 5 \\ 10 & x \end{pmatrix}$ is non – singular matrix (**3 *marks***)

(b) Use Crammer's rule to solve for X and Y

$$\begin{cases} 4x + 3y = 6 \ldots (i) \\ 2x + 5y = 12 \ldots (ii) \end{cases}$$ (**4 *marks***)

(c) Find the matrix which rotates by 45^0 about the origin. (**2 *marks***)

15. A firm makes curtains which are either ordinary or de luxe. Each ordinary curtain takes **3**hours to produce and uses **6**m of material and each de luxe curtain takes **6**hours to produce and uses **7**m of material. The workers of the firm can work for a total of **60** hours and there is **90**m of material available. If the profit on ordinary and de luxe curtains is **4,000**/= TSH and **6,000**/= TSH respectively, find how many of each should be made to maximize profit. (**10 *marks***)

QUESTIONS

SERIES #3

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES 03

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

Instructions

1. This paper consists of two sections A and B with total of **fourteen (14)** questions
2. Answer **all** questions
3. Programmable calculators, phones and any other unauthorized materials are not allowed in examination room
4. Write your examination number on every page of your answer sheet provided
5. All diagrams must be drawn in pencils
6. All writings must be in black/blue ink

SECTION A (60 Marks)

Answer **all** questions in this section.

1. (a) If a = 0. $2\dot{5}$ and b = 0. $\dot{5}$, write in the form of a/bwhere b ≠0.

(b)Three bells are set to ring at intervals of 12 minutes, 15 minutes and 24 minutes. If they started together at 2:00 p.m, then find at what time will the bells ring together for thesecond time.

2. (a) Solve the value of x if $(1/16)^{x+3}(1/32)^{-x} = 1$

(b) If log 2 = 0.3010, without using mathematical tables, find the value of log 5

3. (a) A box contains 4 white balls and 5 black balls. Two balls are selected at random without replacement. Find the probabilitythat

(i) Both are white balls

(ii) The first is black and the second is whiteball

(b) In a class of 15 students who take either Mathematics or Biology, 12 students take Mathematics, 8 students take Biology. If each student takes either subjects, find using formula the number of students who take Biology but not Mathematics

4. (a)The distance between (1,5) and (k+5, k+1) is 8. Find K, given that it is positive

(b)If $\underset{\sim}{U}=4i+6j$ and $\underset{\sim}{V}=½i-3j$,

Find i. $\underset{\sim}{W}=½\underset{\sim}{U}-2\underset{\sim}{V}$

ii. $|\underset{\sim}{W}|$ correcttotwodecimalplaces.

5. (a)The area of the triangle ABC is 140 cm^2, AB = 20, AC = 14cm, find the angleBAC

(b) Triangle XYZ is similar to triangle ABC and XY = 8 cm. If the area of the triangle XYZ is 24 cm^2 and the area of the triangle ABC is 96 cm^2. Calculate the length ofAB.

6. (a) The variable *v* varies directly as the square of *x* and inversely as *y*.
Find *v* when *x* = 5 and *y* = 2 ?given that when *v* = 18 and *x* = 3 the value of *y* = 4 .

(b) The compression I of spring is directly proportional to the thrust,
T exertedonit.Ifthethrustof4Nproducesacompressionof0.8cm,find:

(i) Thecompressionwhenthethrustis5N

(ii) Thethrustwhenthecompressionis0.5cm

7. (a)MaulidhastoshareeightybookswithhisyoungsistersArafaandJamila.
HedecidedthatforeverytwobooksJamilagets,Arafagetsthreebooksandhegetsfive books.Findthenumberofbookseachgets

(b) Kijembestartedthebusinesson16th March,2020withcapitalincash2,066,000/=
March17boughtgoodsforcashfor1,000,000/= 19
bought Shelves for cash110,000/=
20 sold goods for cash900,000/=
21 purchases goods for cash
800,000/= 22 sold goods for cash
1,400,000/=
26 paid rent 300,000/=

Record the above transactions in the Cash Account and Extract a trial balance.

8. (a). The product of three consecutive terms of a geometric progression (G.P) is 8000. If the first term is 4. Find the second term and thirdterm

(b). Mahona invested a certain amount of money in a Savings Bank whose interest ratewas 10% compounded annually. After two years he got 5000shillings.

i. How much did he invest at thestart?

ii. How much did he receive as Interest at the end of twoyears?

9. (a) Find the valueof$\frac{\sin(150^0)\cos(315^0)}{\tan(300^0)}$without using mathematical tables

(b) Calculate the angles of a triangle which has sides of lengths 4m, 5m and 10m.

10. (a). Given that x2 –y2 = 27 and x + y = 9 find the value of xy
(b). Solve the equation $2x^2 - 3x - 5 = 0$ by completing the square.

SECTION B (40 Marks)

Answer **all** questions

11. (a)
Theheights50plantsrecordedbyacertainresearcheraregivenbelow.Heightsareincentimetres(*cm*).

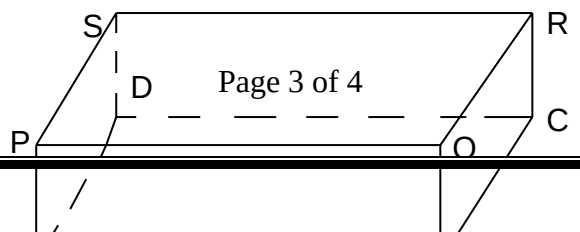
56	82	70	69	72	37	28	96	52	88
41	42	50	40	51	56	48	79	29	30
66	90	99	49	77	66	61	64	97	84
72	43	73	76	76	22	46	49	48	53
98	45	87	88	27	48	80	73	54	79

(i)Usethesedatatopreparefrequencydistributiontablefrom 21- 30,31- 40,etc.
(ii)Draw ahistogramfortheheightoftheplants.
(iii)Calculatemeanandmedian heightoftheplants.

(b) AB and BC are tangents to the circle at A and C respectively, $A\hat{D}C = 52$ .Find $m(A\hat{B}C)$.

12. (a) Given that the radius of the earth is 6400 km, find
(i) the length of the parallel latitude 30”N
(ii) the shortest distance along the surface of the earth from town Q whose position is (30” N,10” E) to town P whose position is (30”N,50”W)

(b)The rectangular block with top PQRS and base ABCD has AB=9m,BC=12m and AP=3m



Calculate

(i) The length of AC

(ii) The angle between PC and AC

13. (a) A linear transformation M maps the point (x,y) onto (x',y') where x' = x – y y' = 2x + y

(i) Write the matrix M of this transformation.

(ii) What is the matrix M^{-1} or the inverse of M?

(iii) Compute the product of the matrix MM^{-1}.

(b) Use inverse matrix method to solve the simultaneous equations.

$$x - 2y + 3 = 0$$
$$3y + 2x - 8 = 0$$

(c) . Find the image of point A(3,4) after its reflection in the line y + x = 0 followed by another reflection in the line y = 0

14. (a) . Given a function $(x) = x^2 - 2x - 3$

Find (i) line of symmetry (ii) The turning point (iii) Domain and range of f(x)

(b). A craftsman wishes to decide how many of each type A and B charcoal stove he has to fabricate in order to maximize profit for this month. Unit profit for type A stove is shs. 1000 and Unit profit for type B is shs. 1500. Type A stove requires $1m^2$ of mild steel sheet per unit and type B requires $2m^2$. He has only 12 m^2 of mild steel available. He can fabricate a total of 8 stoves of either type per month. How many of each type should hefabricate?

QUESTIONS

SERIES #4

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES 04

BASIC MATHEMATICS

Time 3:00 Hrs. **YEAR: 2022**

Instructions

1. This paper consists of two sections A and B with total of **fourteen (14)** questions
2. Answer **all** questions
3. Programmable calculators, phones and any other unauthorized materials are not allowed in examination room
4. Write your examination number on every page of your answer sheet provided
5. All diagrams must be drawn in pencils
6. All writings must be in black/blue ink

SECTION A (60 Marks)

Answer **all** questions in this section

1. (a) A group of 32 people go to a cinema, which cost 5801 = each. What is the approximate total cost?

   (b) In a school there are 90boys and 60girls. On Monday, 10% of the boys were absent and 85% of the girls were present.
   What percentage of pupils in the school were absent on that day?

2. (a) (i) solve for n if $(3^n)(2^n) = 6^{2n+8}$

   (ii) Rationalize the denominator: $\frac{-2}{\sqrt{2}+2}$

   (b) Find $\log \sqrt[3]{x}$ if $\log x = \bar{8}.0524$

3. (a) in a class of 105 students, 25 study Mathematics but not History, 50 study History but not Mathematics. If each student studies at least one subject. Determine the number of students who study History.

   (b) A month in picked at random. What is the probability that it ends with "ember"?

4. (a) If the midpoint of the line segment joining the points A (3,4) and B (k, 6) is (x,y). If (x,y) lies on the line whose equation is x + y = 10. Find the value of k

   (b) Given vectors, $\underset{\sim}{a} = {}^1/_2\,\underset{\sim}{i} + {}^1/_3\,\underset{\sim}{j}, \underset{\sim}{b} = {}^2/_3\,\underset{\sim}{i} + {}^1/_3\,\underset{\sim}{j}$ and $\underset{\sim}{c} = \underset{\sim}{i} + 6\,\underset{\sim}{j}$.

   Determine the unit vector in the direction of the vector $\underset{\sim}{d}$ where $\underset{\sim}{d} = 6\underset{\sim}{a} + 3\underset{\sim}{b} - \underset{\sim}{c}$

5. (a) Given that triangle PQR is similar to triangle MNR where $\overline{PQ}$= 7cm, $\overline{QR}$ = 8cm, $\overline{MN}$ = 21cm and $M\hat{N}R = 60^\circ$. Find the area of triangle MNR

   (b) Each interior angle of a regular polygon is four times the exterior angle.
   Find the area of the polygon if it is inscribed in a circle whose radius is 6cm.

6. (a) Shop A sells a packet of 8 pens for 1, 200 Tshs and shop B sells a packet of 20 of the same pens for 3, 200 Tshs. Which is the better buy?

   (b) The number of tablets given to a patient was found to be direct proportional to the weight of the patient. If a patient with 36kg was given 9 tablets, Find how many tablets would be given to a patient whose weight is 48kg

7. (a) The price of the Radio is Tshs 120,000/= which includes V.A.T (value Added Tax). Find the prince of the Radio before VAT, if the rate of V.A.T is 20%

   (b) (i) Mr. Paschal started a business on 1st Jan 2019 with capital in cash 1,000,000/=
   2nd Jan purchased goods in Cash 300,000/=
   5th Jan sold goods in cash 100,000/=
   10th Jan Paid office rent in cash 150,000/=
   17th Jan Bought goods in cash 250,000/=
   18th Jan Bought cleaning Machine in cash 150,000/=
   20th Jan Paid wages 50,000/=
   27th Jan sold goods in cash 400,000/=
   Prepare Trial Balance

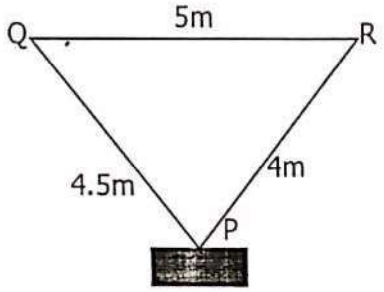
   (ii) Write any two functions of Trial Balance

8. (a) After completing form four education, Juma worked at Wazo Hill cement Industry with a starting annual salary of 1,500,000 shillings. If the industry offers an annual increment of 60,000 shillings. How much will be the total sum he earned after 10years

(b) Esther deposited Tsh 2, 000,000/= in a bank at a compound interest rate 8% semi annually for 2 years. Calculate the amount of money she received at the end of the period.

9. (a) If $\propto$ and β are complementary angles and $\sin \propto = \frac{\sqrt{3}}{5}$. Find $\cos \propto + \tan \beta$.

(b) An object is hung from a horizontal beam by two chains fastened at point Q and R, 5m apart. If the chains are 4.5m and 4m long. Find the angles made by the chains with the beam



10. (a) (i) Factorize the quadratic expression $2x^2 - 11x + 12$ by splitting the middle term.

(ii) The operation $*$ is defined as $a * b = \begin{cases} 2a - b \text{ if } a > b \\ 2b + a \text{ if } a < b \end{cases}$

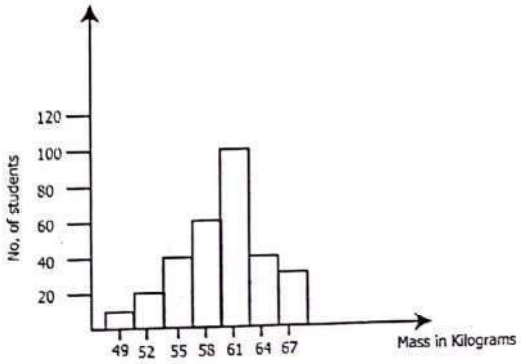
Find the value of -2 * -1

(b) Solve for x: $\frac{x^2}{(1+x)(2+3x)} = 1$

SECTION B: (40 MARKS)

Answer **all** questions in this section

11. (a) The following Histogram represents Mass of students in kilograms



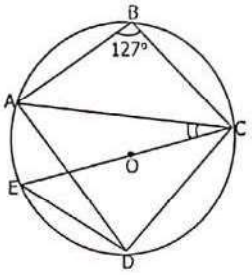
From the graph

(i) Prepare the frequency distribution table

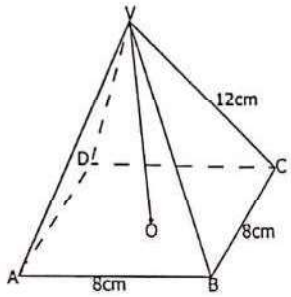
(ii) How many students are in the school?

(iii) Find the mean and median

(b) $\overline{CE}$ is a diameter of a circle ABCDE below if $A\hat{B}C = 127^{o}$. Find the value of $A\hat{C}E$.



12. (a) ABCDV is a right pyramid in which horizontal base ABCD is a square of side 8cm. If V is vertex and VA = VB = VC = VD = 12cm



Calculate

(i) The height of the pyramid

(ii) The angle $\overline{V}A$ makes with the base ABCD

(iii) The volume of the pyramid

(b) A ship is steaming at 15 knots in western direction from Q to P. IF the position of P is 40°S 178°E and that of Q is 40°S 172°E, how long will the journey take?

13. (a) During PRIZE GIVING day for students who did well in Mock examinations at KISUMU secondary school; a certain number of cows and chickens were slaughtered. If there were 56 heads and 118 legs of cows and chickens altogether.
Using inverse matrix method, determine how many cows and chickens slaughtered on that day.

(b) A point (x,y) is rotated through 90° and then reflected in the line y = x. Find

(i) A single matrix for this double transformation

(ii) The image of the point (2,3) under this double transformation

14. (a) The function f is defined by $f: x \longrightarrow ax + b$ for $x \in R$, where a and b are Constants. If it is given that f(2) = 1 and f(5) = 7

(i) Find the value of a and b

(ii) Solve for x when f(x) = 0

(b) Two types of food A and B contain 4 and 6 units of protein and 5 and 4 units of starch per kg respectively.
The cost of food A is Tshs 5000 per kg. The cost of food B is Tsh 6000 per kg.
If the minimum daily intake is 15 units of protein and 12 units of starch, how much food should be bought in order to meet these conditions?

QUESTIONS

SERIES #5

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #05

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

INSTRUCTIONS

1. This paper consists of sections A and B with a total of **fourteen (14)** questions.
2. Answer all questions in section A and B
3. Each question in section A carries **six (06) marks** while each question in section B caries **ten (10) marks**
4. All necessary working and answers for each question must be shown clearly.
5. Mathematical tables and non-programmable calculator may be used.
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 sheet(s)

SECTION A (60 Marks)

Answer **all** questions in this section.

1. (a) simplify the expression $\dfrac{3x^3+10x^2+8x}{-3x-4}$

   (b) Chakubanga decided to go out for shopping. She used $\frac{1}{4}$ of her saving to buy Chocolate, $\frac{2}{3}$ of the remaining to buy ice cream. If she was left with 4200/=. Find
   (i) How much shilling she had at the beginning of the shopping?
   (ii) How much money did she use for chocolate?
   (iii) How much money did she spend for both chocolate and ice cream?

   (c) At a disco party club a red light flashes on every 56 minutes and a green light flashes on every 70 minutes. If the two light are switched on at the same time,
   (i) After how long will both light flashes on to gather?
   (ii) If the party was on Sunday 2349 when will they flash again?

2. (a) If $a = 0.8\dot{5}$ and $b = 0.2\dot{1}\dot{1}$ find the value of $\frac{b}{a}$ in simplest form

   (b) (i) The interior angle of a regular polygon is one hundred and eight degrees greater than the exterior angle. How many sides does the polygon have? And suggest the name of the polygon.
   (iii) Solve for x given that $25(2^{\log x}) = x$

(c) Given that $a:b=5:2$ and $b:c=3:4$, find $a:c$

3. (a) Each of the 50 students in a class must take at least one of the following subjects: cookery and needle work. If 30 take cookery and 20 take needle work, how many take both subjects

(b) (i) Show this $(A \cup B)'$ on a Venn diagram

(ii) A census was made in a certain village and found that some of families are farmers and some are hunters and some practice both farming and hunting, at this village were forty families. It was also found that the number of families who practice farming only were six more than twice the number of hunters only. However, families who practice both hunting and farming were three times the number of families who practice hunting only. Furthermore, there were four families who just practice none of these activities. Calculate the probability of selecting families who practice either hunting or farming.

4. (a) Both lines r and s passes through the point (k,9). Line r has a slope of $-\frac{4}{3}$ and pass through the point (5, -3). Determine

(i) The value of k

(ii) Equation of s in standard form of ax + by + c = 0. If its x – intercept is 4

(b) Mikumi is one hundred forty kilometers of a bearing of seventy degrees from Iringa. Makambako is one hundred sixty kilometers at a bearing two hundred fifteen degrees from Iringa. Sketch the positions of the towns relative to each other. Hence calculate the displacement from Makambako to Mikumi.

5. (a) the surface area of a solid sphere whose radius is six centimeters is equal to the surface area of a solid right cylinder with radius two centimeter. Find the height of the cylinder.

(b) (i) Prove that the bisector of the vertical angle of an isosceles triangle is perpendicular to the base of its midpoint.

(ii) Find the area of a regular decagon inscribed in a circle with radius of ten centimeters

6. (a) The number of the square tiles needed to surface the floor of a hall varies inversely as the square of the length of a side of the tile used. If 2016 tiles of sides 0.4 m would be needed to surface the floor the hall. How many tiles of sides 0.3 m would be required?

(b) (i) A shopkeeper sold five hundred sweets. Some sweets costs five shillings and some costs eight shillings. The cash received for the more expensive sweets was one hundred more than for the cheaper sweets. Find the number each kind of sweets.

(ii) using the information in 6(b) above. Assuming that you are in US how much USD could you use for the cheaper sweets if 1 USD is equivalent to Tsh.1200/=

7. (a) One of the IT in the city lived a quarter of his age in life as a Teacher, one fifth as a company manager of Tobacco and one third as a donor of SIDO. He then spent eighteen point two years eating and other luxuries in the city. How old was IT? And state the number of decade he spent on earth.

(b)

BALANCE SHEET AS AT 31st DECEMBER 2020

Liability	Amount	assets	amount
Capital	330,000	Equipment	60,000
Creditors	100,000	Furniture	90,000
Balance over draft	60,000	Premises	30,000
		Machines	70,000
		Stock	100,000
		Debtors	40,000
		Cash in bank	60,000
		Cash in hand	40,000
	490,000		**490,000**

(i) Calculate total current assets
(ii) Calculate total fixed assets
(iii) Calculate current ratio
(iv) Calculate total current liabilities
(v) Calculate working capital

8. (a) second term, fifth term and seventh term of AP is the first three terms of a geometric progression. Calculate the common ratio and the second term of the geometric progression.

(b) (i) A series of an arithmetic progression has six, a number and thirty-eight. Find the number

(ii) Find the sum of all the integers from one to one hundred which are not divisible by five.

9. (a) You are walking up a five hundred meters high hill. The trail has an inclined of twelve degrees. How far will you walk to get to the top of the hill. (your answer in kilometers)

(b) (i) consider two squares of different size. Draw the smaller square ABCD inscribed in the lager one PQRS whose vertices divides the length of the larger at a ratio $a:b$ such that the length $l = a + b$ prove the Pythagoras theorem.

(ii) A student is standing ten meter away from a foot of a big and tall tree and observed that the angle of elevation is fifty five degrees. How high is he if it is sixteen high meters?

10. (a) (i) What must be added to make the expression that the difference between the square of a number and twelve times the number will make it a perfect square.

(ii) The sum of the squares of two consecutive numbers is five. Find the numbers

(b) The entrance door of the house of Mr. Kanji Bai has two stairs, the length of the base stair is twelve plus a certain number while its height is two plus the same number. However, the second stair's height is four times the same number from the first stair, while its length is four plus the same number. Moreover, the second stair is on top of the base stair

(i) Write the expression for the sum of the area of the down stair and the upper stair
(ii) What is the value of the number if the total area of the stairs is 104 cm^2

SECTION B (40 Marks)

Answer all questions in this section.

11. (a) A survey of 50 families showed the number of children per family as follows;

Number of children	1	2	3	4	5
Number of families	19	18	9	3	1

(i) Write down the modal number of children per family

(ii) Find the median number of children per family

(iii) Calculate the mean number of children per family

(iv) What is the probability that, if the number of children selected randomly to go school is greater or equal to 3?

(b) The mean of q numbers is 20. If the same numbers together with 30 give a new mean of 22, find the value of numbers q

(c) In a company there are three people who shares a property in the ratio 2:x:y. it is known that y = x + 2. if the largest shareholder had 39,100/= in monetary terms, find the value of this property.

12. (a) If Veronica and Ntabho were along a circle of longitude of V (28^0N, 30^0E) and N (2^0S, 30^0E) respectively. Find the distance between them in both km and nm

(b) (i) A ship start a journey from (40^0N, 28^0E) and sails to 1000 nm due East. Find the location of its new location(place)

(ii) Show that the radius of a circle with an arc of length π m and central angle of $\frac{\pi}{6}$ is 6 m

(c) The right circular cone has a radius of eight centimeters and a slant height of ten centimeters. Calculate the volume of this right circular cone and the angle between radius and its slant height.

13. (a) For what value of p will the matrix $\begin{pmatrix} p-1 & p+3 \\ 1 & 6p \end{pmatrix}$ be non-singular matrix?

(b) If $A = \begin{pmatrix} 2 & -3 \\ -2 & 1 \end{pmatrix}$ and $f(x) = x^2 - 3x - 4I$. Find $f(A)$, Where *I* is an Identity matrix. What is the name of a such matrix?

(c) A shopkeeper is planning to start a business using two type of commodities. With these commodities, the shopkeeper found that. If he takes three times the first commodity more than half of the second commodity, he gets the profit of one thousand two hundred shillings. However, if he takes twice the first commodity less than three times the second commodity he gets four hundred shillings as a profit. Using Cramer's rule find which type of commodity, the first one or second one he has to buy in large quantity to get large profit?

14. A company sells refrigerator and washing machines. Each refrigerator takes up 1.8 m^2 of space and costs 300,000 shillings. Whereas each washing machine takes up 1.5 m^2 of space and costs 500,000 shillings. The owner of the shop has 6,000,000 shillings to spend and has 27 m^2 of space.

(a) Write down all the inequalities which represent the given information

(b) If he makes a profit of 30,000 shillings on each refrigerator and 40,000 shillings on each washing machine, find how many refrigerators and washing machines he should sell for maximum profit.

QUESTIONS

SERIES #6

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #06

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

Instructions

1. This paper consists of two (2) sections A and B.
2. Answer **all** questions in both sections.
3. All necessary working and answers for each question done must be shown clearly.
4. Non-programmable calculators and Mathematical tables may be used.
5. Cellular phones are not allowed in the Examination room.
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) Simplify the expression
$\left(3\frac{1}{4}+2\frac{3}{8}\right)$-$\left(4\frac{7}{16}-5\frac{1}{4}\right)$

(b) (i) Without using tables or calculator, evaluate $\frac{5.1\times570}{0.68\times0.095}$, giving your answer in standard form.

(ii) In peeling potatoes 4% of the mass of the potatoes is lost as peel. How much is left for use from a bag containing 55kg?

2. (a) Rationalize the denominator of
$\frac{\sqrt{2}}{\sqrt{22}\ +\ 3\sqrt{2}}$.

(b) (i) Solve for n if
$\left(\frac{3}{5}\right)^{n-1}=\left(\frac{25}{9}\right)^{2n}$

(ii) Find the value of y given that $1+log_2 3+\ log_2 y=\ log_2 12$

3. (a) In a group of 100 people, 72 people can speak English and 43 people can speak French. How many people can speak:

(i) English only

(ii) French only

(iii) Both English and French

(b) The probability that Ally uses a Daladala is 0.65 and the probability that he arrives in school late is 0.3. Find the probability that

(i) Uses Daladala and arrives in school late

(ii) Does not use Daladala and arrives in school early.

4. (a) Find the equation of the line passing through the points (-3, 4) which is parallel to x-axis.

(b) If $\underline{a}$ = (3, 4), $\underline{b}$ = (1, -4) and $\underline{c}$ = (5, 2), Find:

(i) $\underline{d} = \underline{a} + 4\underline{b} - 2\underline{c}$.

(ii) Magnitude of vector $\underline{d}$ leaving your answer in the form of $m\sqrt{n}$.

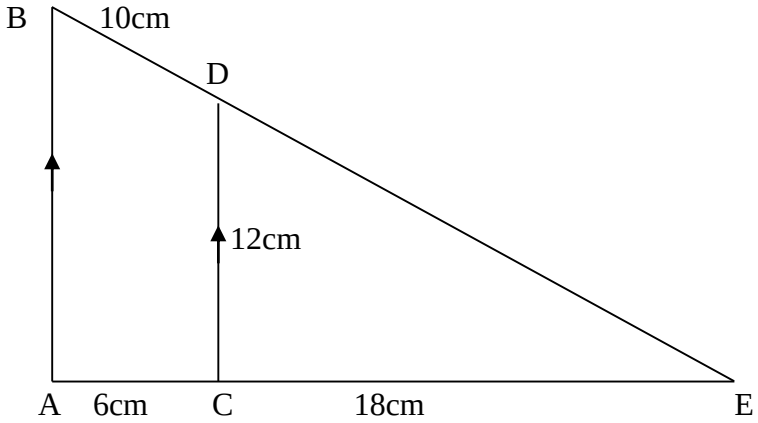
(iii) The direction cosines of $\underline{d}$.

5. (a) Find the circumference of the circle whose area is equal to the sum of the areas of the three circles with radius 2cm, 3cm and 6cm.

(b) (i) The interior angle of a regular polygon exceeds the exterior angle by 150^o. Find the number of sides of that polygon.

(ii) In the figure below calculate, the length $\overline{DE}$.

If the length $\overline{AC}$ = 6cm, $\overline{CE}$ =18cm, $\overline{DC}$=12cm, $\overline{BD}$ = 10cm



6. (a) The number of surface tiles needed to a surface of floor of hall varies inversely as the square of the length of sides of the tiles used. If 2016 tiles of side of 0.4m would be needed to surfaces of the floor of a certain hall. How many tiles of 0.3m would be required?

(b) Suppose the current rate of exchange between the Tanzanian shillings and the Euro is 650 Tshs per Euro. A tourist changes 200 Euros to Tshs. How much does he get?

7. (a) (i) Three people share the property in the ratio of 2:x:y and it is known that y= x+2. If the largest shareholder got Tshs 39,000. Find the value of the property.

(ii) Mr. Sinabei gets a loss of 20% by selling ear rings at 2500/=. At what price must he sell ear rings in order to get a profit of 52%?

(b) Songambele started business on 1st January 2010 with capital in cash 600,000/=.

January:

2:	Purchased goods and paid cash	400,000/=
3:	Bought goods for cash	100,000/=
4:	Sold goods for cash	300,000/=
5:	Paid salary in cash	150,000/=
8:	Sold goods in cash	250,000/=
8:	Paid cash for travelling expenses	120,000/=

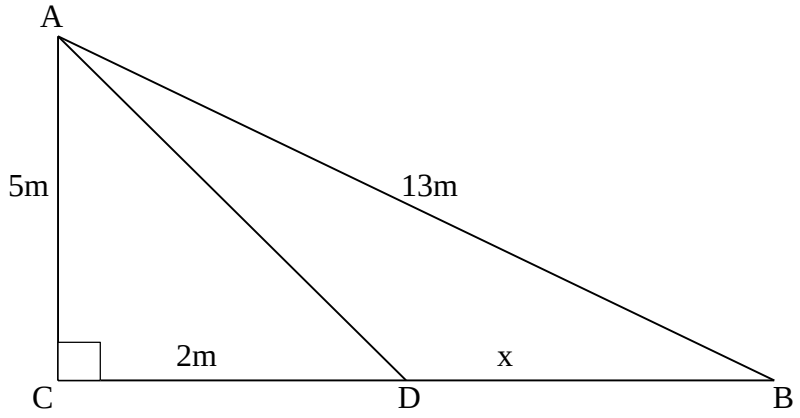
Enter the transactions in each account and balance them.

8. (a) (i) If 6, x, y and 15 are consecutive terms of an A.P. Calculate the value of x and y. And hence find the common difference.

(ii) Find the sum of the first five terms of the series 9 + 27 + 81+ …..

(b) The first level of one wall of pyramid is made up of 497 bricks where as the top level has 2 bricks. If the levels differ from each other by 5 bricks. Determine the number of:
(i) Levels of the bricks.
(ii) Bricks used to make the wall.

9. (a) Use Pythagoras Theorem to find the length **x** in the diagram below:



(b) The angle of elevation of the top of a tower from a point 42m away from the base on level ground is 36°. Find the height of the tower.

10. (a) Given that $\left(a+\frac{1}{a}\right)^2 = 14$. Find the value of $a^2 + \frac{1}{a^2}$.

(b) A train normally travels 240km at a certain speed. One day, due to bad weather, the train's speed is reduced by 20km/h. So that the journey takes 2 hours longer. Find the normal speed of the train.

SECTION B: (40 Marks)

Answer **all** questions in this section

11. The scores of a Mathematics test taken by 60 students were recorded as hereunder:

30	56	21	49	58	22	38	27	31
25	34	48	33	20	34	30	50	26
25	50	36	29	21	61	33	51	20
26	28	45	36	26	60	42	21	63
43	24	30	27	56	35	32	35	52
41	56	41	30	36	53	63	57	54
34	58	34	59	26	30			

(i) Prepare the frequency distribution table for the data by using the intervals 20-24, 25-29, etc.

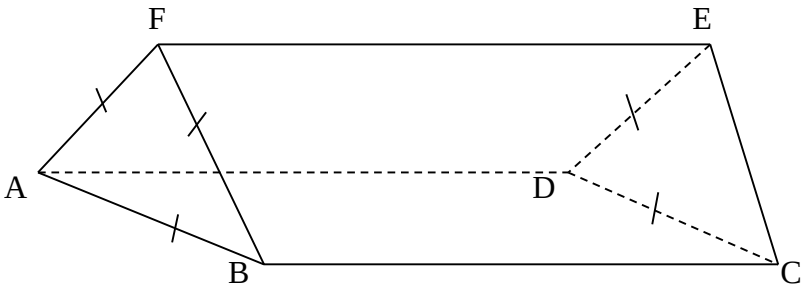
(ii) Calculate the mean by using assumed mean method.

(iii) Calculate the median of the data.

(iv) Draw a histogram and use it to estimate the mode for the data.

12. (a) A ship sails northward from Dar es Salaam (7^oS, 39^oE) to Tanga (5^oS, 39^oE) at an average speed of 12 knots. If it leaves Dar es Salaam at 12.00 noon, when will it arrive at Tanga?

(b) Given a prism with triangular cross section. Where AB = AF = DC = DE = 8cm and BF = CE = 10cm. The length of the prism is 16cm



Find (i) The length of FD.

(ii) The surface area of the prism.

(iii) The volume of the prism.

13. (a) Find the value of "K" if matrix

$\begin{pmatrix} 2(k+1) & k \\ 4k-3 & 3+k \end{pmatrix}$ is singular matrix.

(b) Solve the simultaneous equation

$\begin{cases} -2x + 1.5y = 5 \\ 4x - y = 2 \end{cases}$ by matrix method.

(c) What is the image of the point (1, 2) under the transformation matrix $\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$ followed by $\begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}$?

14. (a) If $f(x) = x^2 - 4$, Determine

(i) Domain and range of f(x)

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

(iii) Calculate the x and y intercepts of $y = x^2 - 4x + 3$.

14. (b) A person requires 10 units, 12 units and 12 units of A, B and C respectively for his garden. A liquid product contains 5 units, 2 units and 1 unit of A, B and C per carton respectively and a dry product contains 1 unit, 2 units and 4 units of A, B and C per carton respectively. If a liquid product sells for Tshs 3000/= per carton and a dry product sells for Tshs 2000/= per carton. How many of each should be produced to minimize the total cost to meet the requirements?

QUESTIONS

SERIES #7

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #07

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

INSTRUCTIONS:

1. This paper consists of two sections A and B
2. Answer all questions
3. Show clearly the solution of all questions
4. Cellular phones and calculators are not allowed in the examination room
5. Use mathematical table and where necessary use $\pi = 3.14, Radius\ of\ the\ Earth = 6370km$
6. Write your examination number on top right corner of your answer sheets.

SECTION A (60 Marks)

1. (a) Azam biscuit factory packs biscuits in packets of 18, 48 or 60 biscuits each. What is the maximum number of biscuits that can be packed in any of these quantities?

   (b) Express 0.05473 correct to
   (i) Three significant figures
   (ii) Three decimal places
   (iii) Tenths

2. (a) Solve for X if $9^{x-2} \times 81^{2x} = 27^{2x}$

   (b) Solve for x if
   $log_4^8 + 5log_4^x = 4$

3. (a) In a class of 30 students, 20 are taking physics, 12 are taking both Chemistry and Physics. How many students in this class take Chemistry if 8 students take neither Physics nor Chemistry? (use venn diagram)

   (b) In a box three are 6 white balls and 4 red balls. If two balls are drawn without replacement. Find the probability that are of different colours (use tree diagram).

4. (a) The points (3,M), (-1,5) and (4,10) are collinear. Find the value of M.

(b) Given that $\underline{U} = -12i + 9j$. Find

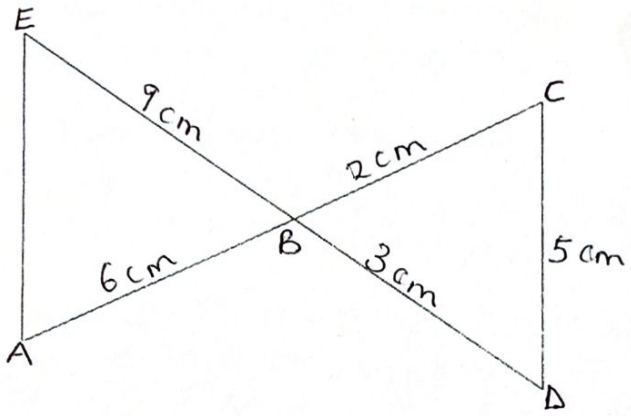
(i) The unit vector in the direction of vector $\underline{U}$

(ii) The direction cosine

(iii) The angle that makes with y-axis

5. (a) The length of a side of a regular hexagon is 6cm. Find the area of a regular polygon when inscribed in a circle.

(b) Prove if Δ ABE $\sim$ Δ DBC and hence find AE



6. (a) Four men take 3 hours a day to cultivate a shamba for 4 days. If 6 men take 2 hours a day to cultivate the same shamba. How long would it take them to finish the task?

(b) If V varies directly as the square of X and inversely as Y and if V = 18 when X = 3 and Y = 4. Find the value of V when X = 5 and Y = 2

7. (a) A woman bought a car for Tshs. 8,000,000/= and sold it for a loss of 20%. Find the selling price.

(b) Extract a trial balance from the following information.

Opening stock	=	25,000
Cash	=	36,000
Sales	=	111,790
Rent	=	5,000
Rates	=	3,000
Purchases	=	80,790
Capital	=	50,000
Return outward	=	4,000
Carriage inward	=	3,000
Carriage outward	=	2,000
Return Inward	=	2,000

Drawings	=	1,000
Closing stock	=	20,000
Transport	=	8,000

8. (a) Find the sum of the first 5 terms of the following series

$log_3^x + log_9^x + log_{81}^x$

(b) The second term of an A.P is 2 and the sixth term is -14. What is the first term and common difference?

9. (a) If $COS\ B = \frac{-\sqrt{3}}{2}$ and B is a reflex angle. Find the possible value of angle B.

(b) The lengths of a rhombus are 17cm each. If the length of one diagonal is 16cm. Find the length of the other diagonal

10. (a) Solve the quadratic equation by completing the square:
$2x^2 + 3x - 2 = 0$

(b) Factorize completely
(i) $x^2 + 3xy + 2y^2$
(ii) $64a^2 - 25$

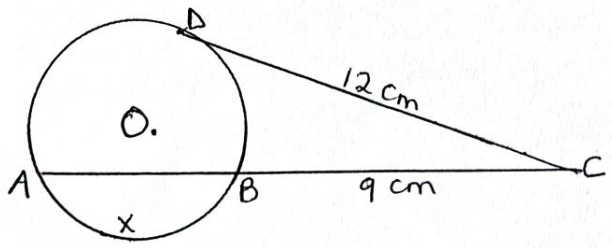
SECTION B (40 Marks)

11. (a) The table below shows a distribution of scores of 60 students in mathematics results

Marks	45 – 55	56 – 66	67 – 77	78 – 88	89 - 99
Cumulative frequency	9	27	47	52	60

(i) Draw the histogram and estimate the mode score
(ii) Find the median score
(iii) By using assumed mean (A) = 72. Calculate the mean score

(b) Find the value of X from the following figure if O is the centre of the circle



12. (a) The position of Abuja (Nigieria) and Bonn (Germany) to the nearest degrees are $(9^0N,7^0E)$ and $(51^0N,7^0E)$respectively. Calculate the distance apart in both kilometer and nautical miles.

(b) Draw a rectangular box ABCD and the points E,F,G and H are vertically above in the respective order. If AB = 12cm, BC = 5cm, GC = 6cm

(i) Find diagonals AC and AG

(ii) Find the angle between AG and the base

(iii) Is HD and AB skew lines?, Why?

(iv) State number of faces, edges and vertices

13. (a) Use the inverse matrix method to solve the following system of equations

$$\begin{cases} 2x + 3y = 12 \\ y - 3x = -7 \end{cases}$$

(b) Determine the possible values of X for which the matrix A has inverse where

$$A = \begin{bmatrix} X-2 & 1 \\ 2 & X-3 \end{bmatrix}$$

(c) A matrix T maps the points (4,2) into (0,2) and point (6,1) into (4,1). Find the matrix T.

14. (a) A Company manufactures speakers and radios. A speaker cost sh. 4500 to make and a radio costs sh. 6000 to make. The weekly production budget is sh. 540,000. In addition, the factory can make at most 100 of either type in a week. A speaker takes 1 hour to complete and a radio takes 4 hours. There are 160 hours available in a week. Given that one speaker and one radio yield a profit of sh. 25,000 each, find the maximum weekly production plan and calculate the profit yielded from such a plant in a week.

(b) The function f is defined as

$$fx = \begin{cases} 2x - 4 \; when \; x \geq 2 \\ 4 \; when \; -2 \leq x < 2 \\ -x \; when \; x < -2 \end{cases}$$

(i) Sketch the graph f

(ii) From the graph determine the domain and range of f.

QUESTIONS

SERIES #8

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #08

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

INSTRUCTIONS

1. This paper consists of ten (**14**) compulsory questions.
2. This paper consists of sections **A** and **B**.
3. Mathematical table and non-programmable calculators may be used.
4. Cellular phones are not allowed.

SECTION A: (60 Marks)

Answer all questions in this section showing all necessary working and answers.

1. (a) Express 0.05473
   i. Correct to three (3) significant figures.
   ii. Correct to three (3) decimal places.
   iii. In standard form.

   (b) Evaluate $\frac{0.0084 \times 1.23 \times 3.5}{2.87 \times 0.056}$ without using mathematical tables and express the answer as a faction in its simplest form.

2. (a) Solve the equation $\log_4 5x - \log_4 (x + 2) - \log_4 3 = 0$

   (b) By rationalizing the denominator, simplify the following expression: $\frac{\sqrt{3}+\sqrt{2}}{\sqrt{5}+\sqrt{2}}$

3. (a) By substituting $a = \frac{1}{X}$ and $b = \frac{1}{Y}$ in the system of equation:

   $$\begin{cases} {}^{4}/_{X} - {}^{6}/_{2y} = 1 \\ {}^{-1}/_{X} + {}^{3}/_{2y} = -1 \end{cases}$$ Find the solution set (X, Y).

   (b) Let U be a universal yet and A and B be the subset of U where; $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

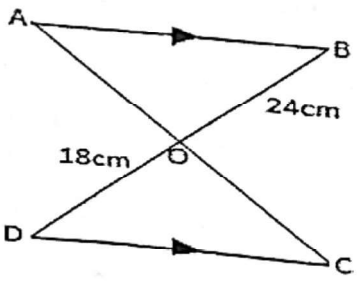
   $A = \{\text{Odd number}\}$. and $B = \{\text{Prime numbers}\}$

   i. Represent this information in Venn diagram.
   ii. Find A n B and (AUB)

4. (a) Given vectors $\mathbf{i} = 6\mathbf{i} + 12\mathbf{j}$ and $\mathbf{b} = 17\mathbf{i} + 18\mathbf{j}$
   i. Find the vector $C = 2a - b$ and its Magnitude correct to 3 significant figures
   ii. Represent Vector C in part (i) on xy – plane.

5. (a) Prove that the sum of interior angles of any triangle is 180^0

   (b) In the figure below AB// CD. Show that DABX ~ DCDX



6. (a) The Variable V varies directly as the square of X and inversely as Y. Find V where X= 5 and Y = 2; given that when V=18 and X = 3 the value of Y = 4.

   (b) The temperature (Ti) inside a house is directly proportional to the temperature (To) outside the house and is inversely proportional to the thickness (t) of the house wall. If Ti = 32 C^0 when To = 24^0 C and t = qcm, find the value of t when Ti = 36i and $T_0 = 18^0C$

7. (a) A radio is bought for sh 400,000 and sold for sh 500,000. Find

   i. The profit made

   ii. The percentage profit.

   (b) An a play cannons of three metals A, B and C in the Proportional's A:b= 3:5 and B:C = 7:6 . Calculate the Proportional A:C.

8. (a) If the 5^{th} term of an arithmetic progression is 23 and the 12^{th} term is 37, find the first term and the common difference.

   (b) Find the sum of the first four terms of Geometric progression which has first term of 1 and a common ratio of ¼.

9. (a) Without using mathematical tables find the value of

$$\frac{\text{Sin } 30 - 2 \tan 45^0}{2 \text{ Cos } 50^0 + \tan 60^0}$$

   (b) Given that sin A = $^4/_5$ and Cos B = $^{15}/_{11}$ if A is obtuse angle and B is an acute angle. Find the Value Cos (A+B)

   (C) If Sin A= $-^1/_2$ find A if $0 \leq A \leq 360^0$

10. (a) If one of the roots of the quadratic equation $X2 + bx + 24 = 0$ is $1^1/_2$ find the value of b.

    (b) Two numbers differ by 3. If the sum of their reciprocal is $^7/_{10}$. Find the numbers.

SECTION B (40 MARKS)

Answer all questions in this reaction

11. The following were cores of 35 students in a Mathematics mock examination.
07, 19, 78, 53, 43, 67, 12, 54, 27, 22, 33, 80, 25, 58, 50, 36, 65, 33, 16, 19, 34, 20, 55, 27, 37, 41, 04, 32, 48, 28, 70, 31, 61, 08, 35.
    (a) Prepare the frequency distribution table using clan interval 0-9, 10-19, 20-29 etc.
    (b) Which clan interval has more students?
    (c) Calculate the median mark.
    (d) Represent the information in histogram.
12. (a) A pyramid with vertex O and edges OA, OB, OC, OD each 13cm long, stands on a rectangular base ABCD where AB=CD=8cm and AD = BC = 6cm. Find
    (i) Total surface area
    (ii) Volume

    (b) P and Q are points on the surface of the earth situated on the same parallel of latitude 50^0N. The longitudes of P and Q are 15^0W and 20^0E respectively. Find the distance between them in nautical mites.
13. (a) (i) Given that $\begin{Bmatrix} x+3 & 6 \\ 2 & x \end{Bmatrix}$ is a singular matrix

    (ii) Given that A = $\begin{Bmatrix} 4 & 3 \\ 0 & 1 \end{Bmatrix}$ and C = $\begin{Bmatrix} 8 & 9 \\ 2 & 1 \end{Bmatrix}$ Find matrix B if AB = C.

    (b) What is the image of a line $5x + 2y = -5$ after rotation through 180^0 clockwise?
14. (a) A shopkeeper sells refrigerators and washing machines. Each refrigerators takes up 1.8m² of space and costs 300,000/= where as each washing machine takes up 1.5 m² of space and costs 500,000/= Tshs. The owner of the shop has 6,000,000/= Tshs. To spend and has 27 m² of space.
    (i) Write down all the inequalities which represent the given information
    (ii) If he makes a profit of 30,000 Tsh on each refrigerators and 40,000 Tsh on each washing machine. Find how many refrigerators and washing machine he should sell for maximum profit.

    (b) The function f is defined as follows:-

$$f(x) = \begin{cases} 1 \text{ if } x \leq 0 \\ x^2 + 1 \text{ if } 0 < x \leq \\ 5 \text{ if } x \geq 2. \end{cases}$$

    (i) Sketch the graph of f(x)
    (ii) Use the graph to determine domain and range of f(x).

QUESTIONS

SERIES #9

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #09

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

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 (6)** 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. Mathematical tables and non-programmable calculators may be used.
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).
8. Where necessary, use the following constants:
   - Pie, $\pi = 3.142$
   - Radius of the earth, $R_e = 6400km$.

This paper consists of **4** printed pages

SECTION A: (60 MARKS)

Answer **all** questions from this section

1. (a) The traffic lights at three different road crossing changes after every 48seconds, 72seconds and 108seconds respectively. If they change simultaneously at 7a.m at what time will they change simultaneously again?

   (b) If $x = 0.567567567...$ and $y = 0.8\dot{3}$ by converting these decimals to fractions, find the exact value of $\frac{xy^2}{y}$ in simplest form.

2. (a) If $\left(\frac{1}{16}\right)^{t+3}\left(\frac{1}{32}\right)^{-5} = 1$ find the value of t.

   (b) Write "L" in terms of M, N and T from the formula $\frac{M}{N} = \frac{1}{2}\sqrt{\frac{L}{T-L}}$.

   (c) Determine the value of x if $\log_5(x+1) - 1 = \log_5(x-3)$.

3. (a) Let μ be a universal set and A and B be the subsets of μ, if $\mu = \{a,b,c,d,e,f,g,h\}$ $A = \{c,g,f\}$ and $B = \{b,d,h\}$. Find:-

   (i) The number of subsets of set A

   (ii) $n(A' \cap B)$

   (b) Find the probability that a king appears in drawing single card from an ordinary deck of 52 cards.

4. (a) The coordinate of P, Q and R are $(2,m), (-3,1)$ and $(6,n)$ respectively. If the length PQ is $5\sqrt{2}$ units, and the mid – point of QR is $\left(\frac{3}{2}, -1\right)$. Find the possible values of m and n.

   (b) Given vector $\underset{\sim}{a} = \frac{1}{2}\left(6\underset{\sim}{i} + 4\underset{\sim}{j}\right)$, $\underset{\sim}{b} = 8\underset{\sim}{i} - 3\underset{\sim}{j}$ and $\underset{\sim}{c} = 2\left(\underset{\sim}{i} + 2\underset{\sim}{j}\right)$. Find:-

   (i) The vector $\underset{\sim}{d} = 3\underset{\sim}{a} - \underset{\sim}{b} + \frac{1}{2}\underset{\sim}{c}$

   (ii) A unit vector in the direction of vector $\underset{\sim}{d}$.

5. (a) Given $\frac{\overline{AB}}{\overline{KL}} = \frac{\overline{BT}}{\overline{LC}} = \frac{\overline{TA}}{\overline{CK}} = 3$ where $\overline{AB}, \overline{BT}$ and $\overline{TA}$ are the sides of the triangle ABT and $\overline{KL}, \overline{LC}$ and $\overline{CK}$ are sides of the triangle KLC. What does this information imply?

   (b) A regular hexagon is inscribed in a circle. If the perimeter of the hexagon is 42 cm, find the radius of the circle and its area.

6. (a) Twelve people can dig a trench in 15 days for 8 hours daily. How long can they take to finish the same work, working for 10 hours daily?

   (b) A variable V varies jointly as the variable A and h. When A = 63 and h = 4, V = 84. Find the value of:-

   (i) V when A = 9 and h = 7

   (ii) A when V = 4.5 and h = 0.5

7. (a) If $a:b=2:3$ and $b:c=5:6$. Find $a:c$ and $a:b:c$

(b) From the following information given by Mbeya Co. Ltd for the year ended 31st December 2021.

Stock (01. 01. 2021) ..... Three quarter of the closing stock.

Stock (31. 12. 2021) ..... $\frac{2}{9}$ of net purchase.

Net purchases during 2021 ..... 432,000.

Gross margin 15%

Expenses ..... 20% of Net profit

Calculate:-

(i) Cost of goods sold

(ii) Gross profit

(iii) Net profit

8. (a) If the 5th term of an arithmetic progression is 23 and the 12th term is 37, find the first term and the common difference.

(b) In how many years would one double one's investment if Tshs 2500 is invested at 8% compounded semi – annually.

9. (a) If $\tan A = -\frac{5}{12}$, where A is an obtuse angle. Find:-

(i) $\cos A + \sin A$

(ii) $-\cos^2 A - \sin^2 A$

(b) A and B are two points on the ground level and both lie West of flagstaff. The angle of elevation of the top of the flagstaff from A is 56^0 and from B is 43^0. If B is 28m from the foot of the flagstaff. How far apart are the point A and B?

10. (a) Solve for the quadratic equation $x^2 - 8x + 7 = 0$.

(b) Solve for x and y if $\begin{cases} x^2 - y^2 = 12 \\ x + y = 6 \end{cases}$

SECTION B (40 Marks)

Answer all questions from this section

11. (a) The marks in basic Mathematics terminal Examination obtained by 40 students in one of the secondary school in Katavi were as follows:-

60,	54,	48,	43,	37,	61,	43,	66,	65,	52,	37,
81,	70,	48,	63,	74,	67,	52,	48,	37,	48,	42,
43,	52,	52,	22,	27,	37,	44,	38,	29,	19,	28,	36,
42,	47,	36,	52,	50,	28.					

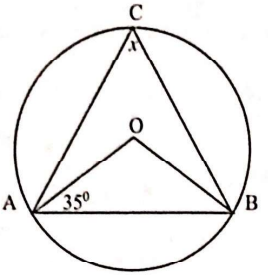
(i) Prepare a frequency distribution table with class intervals 10 – 19, 20 – 29, etc.

(ii) Find the class which contain the median

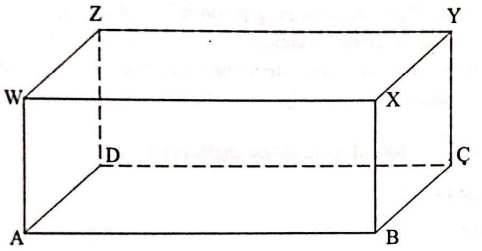
(iii) Find the mean

(iv) Calculate the median.

(b) Find the value of angle x in the figure below, where O is the centre of the circle:-



12. (a) A Rectangular box with top WXYZ and base ABCD has AB = 9 cm, BC = 12 cm and WA = 3 cm.



Calculate (i) The length AC
(ii) The angle between WC and AC

(b) Two places P and Q both on the parallel of latitude 26^0N differ in longitudes by 40^0, find the distance between them along their parallel of latitude.

13. (a) If matrix A is singular, what will be the value of y given that $\begin{pmatrix} 3 & y-1 \\ y+1 & 1 \end{pmatrix}$.

(b) Solve the following simultaneous equation by matrix method:- $\begin{cases} 2x+y=7 \\ 4x+3y=17 \end{cases}$

(c) Find the image of $(3,5)$ after rotation of 270^0 about the origin in the anti – clockwise direction.

14. (a) (i) Without using table of values draw the graph of $f(x)=x^2+2x-4$
(ii) State domain and range of $f(x)$

(b) A transport company is hired to transport 420 people. It has two types P and Q of vehicles to be used. Type P carries 35 passengers and type Q carries 14 passengers. There are at least 10 vehicles of type Q and not more than 9 vehicles of type P. Write inequalities to represent this information.

QUESTIONS

SERIES 10

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #10

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

INSTRUCTIONS

1. This paper consists of two sections, A and B
2. Attempt all questions in both section
3. Show All steps necessary to arrive at your final answer NEATLY and LEGIBLY

FOR EXAMINERS' USE ONLY		
QUESTION NUMBER	**SCORE**	**EXAMINER'S INITIALS**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
TOTAL		

SECTION A (60 MARKS)

1. (a) Calculate the Lowest Common Multiple of 27,186, 558.
   (Leave your answer as the product of prime factors)
   (b) There are 150 people at a cricket match. 20% are children. One half are men and the rest are women. How many women are at the cricket match?
   (c) z is an integer that $-3 < z \leq 2$. Represent z on number line

2. (a) Without using mathematical table show that $\frac{log\sqrt{27}+log\sqrt{8}-log\sqrt{125}}{\log 6-\log 5} = \frac{3}{2}$
   (b) Solve for x in the equation $2^{2x+1} - 9 \times 2^x + 4 = 0$

3. (a) Let A and B be two sets such that $n(A) = 52, n(B) = 60\ and\ n(AUB) = 96$. Find $n(A - B)$
   (b) Given that events A and B are such that $P(A) = \frac{1}{2}, P(AUB) = \frac{3}{5} and\ P(B) = r$. Find r if the events A and B are (i) Mutually exclusive (ii) Independent

4. (a) If $\overrightarrow{AB} = 2i + j$ and the coordinate of A are (1,2), find the coordinate of B.
   (b) One vertex of a parallegram is (5,5) and the equation of two sides and coordinates of the vertices

5. (a) Given two similar triangles with bases 10cm and 0.18m long respectively. Find the area of the second triangle if the area of the first triangle is 40cm2.
   (b) Determine the perimeter and area of the regular octagon inscribed in a circle of 10cm

6. Mr. Mwinyimkuu was given 6000 US dollars by his friend from U.S.A when he was in Kenya. He converted this amount in Kenya shillings. He then travelled to Tanzania where he had to change his Kenyan money into Tanzania shillings. If he exchanged it in the rate 1 US dollars to 72 Ksh and in Tanzania he converted this money at rate 1 Ksh to 17 Tanzania shillings; how much did he loose if he could have converted his money straight from US dollars to Tanzania shillings at the rate 1 US dollars to 1312.07 Tsh?

7. (a) There are some pegs in a basket. 42 of the pegs are blue, 28 of the pegs are pink. Write down the ratio of the number of blue pegs to the number of pink pegs. Give your ration in its simplest form

(b) From the following trial balance of AB, prepare the **trading**, **profit** and **loss account** for the year ending July 31 2004 and **balance sheet** as that date

A TRIAL BALANCE AS AT 31ST JULY 2004

Account name	**Dr**	**Cr**
Cash	450,000	
Capital		1,000,000
Purchase	900,000	
Sales		700,00
Rent	150,000	
Wages	200,000	
TOTAL	**1,700,000**	**1,700,000**

8. (a) The number P, 10 and Q are three consecutive terms of an arithmetic series. The number P, 6 and Q are three consecutive terms of geometric series. Show that $P2 - 20P + 36 = 0$.

   (b) Non –zero numbers P,Q and R are in G.P while P2Q and R are in A.P. Find the common ratio.

9. (a) The upper part of tree broken by the wind, falls to the ground without being detached. The top part of the broken part touches the ground at an angle of $36^0 30$ at a point 5 metres from the foot of the tree. Calculate

   (i) The height at which the tree is broken

   (ii) The original height of the tree

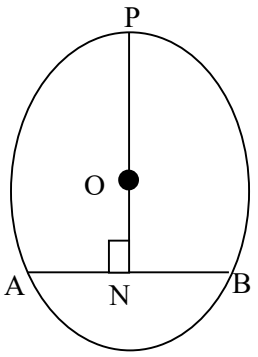
   (b) If $\tan x = \frac{12}{5}, evaluate \frac{\sin x + \cos x}{1 - \sin x}$

10. (a) Factorize completely $243rx^2 - 192ry^2$

    (b) Find the value of x and y if $\begin{cases} x^2 - y^2 = 12 \\ x + y = 6 \end{cases}$

SECTION B (40 MARKS)

11. (a) 0 is the center of the circle, AB = 6cm, and ON =4cm. Show that $AP = 3\sqrt{10cm}$

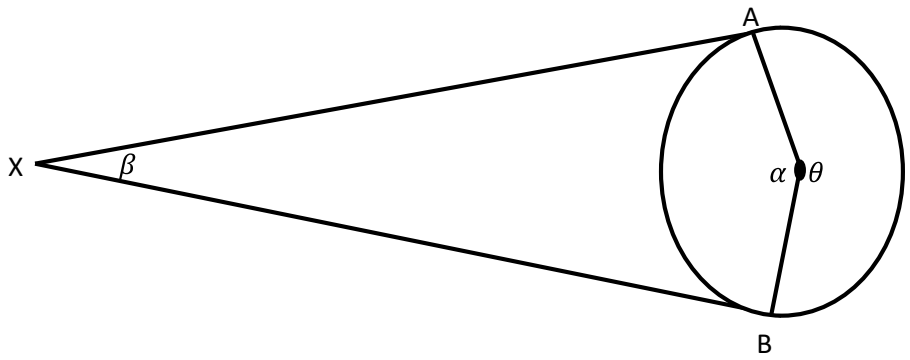


(b) Two tangents AX and BX intersect at point X. θ and $\propto$ are angle at the centre, β is angle at x and O is the centre of the circle. Find

(i) $\propto and\ \beta$ if $\theta = 270^0$

(ii) $\theta\ and\ \beta$ if $\propto = 150^0$

(iii) $\propto and\ \theta$ if $\beta = 50^0$



12. (a) Find the distance measured along the parallel of latitude, between two points whose latitudes are both 560N, and whose longitudes are 23^0E and 17^0W.

(b) A pyramid with vertex V and edges VA, VB and VC each 13cm long has a rectangular base ABCD where AB = CD = 8cm, and AD = BC = 6cm. Calculate

13. (a) Determine the possible value of x which the matrix A has no inverse where $A\begin{pmatrix} x-2 & 1 \\ 2 & x-3 \end{pmatrix}$

(b) Use the inverse matrix method to solve the following system of equations

$2x + 3y = 12$

$y - 3x = -7$

(c) A matrix T maps points (4,2) into (0,2) and point (6,1) into (4,1). Find the image of point obtained in 13(b) above under T

14. (a) A linear function is such that f(2)=11, f(-3)= -4. Find f(0)

(b) Mr. Pello wish to establish a transport company. He needs at least 5 buses and 10 minibuses. Because of limited floor space, he needs at most 30 vehicles altogether. A bus takes up to 3 units of garage space, a minibus takes up to 1 unit of garage space and there are only 54 units of garage space available. A bus takes Tshs 135000 running cost a day and minibus takes Tshs 72000 running cost, a day

(i) Formulate the linear inequalities to summarize the information above

(ii) Calculate the maximum daily cost and corresponding numbers of buses and minibuses.

QUESTIONS

SERIES 11

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR EXAMINATION - SERIES #11

BASIC MATHEMATICS

Time 3:00 Hrs **YEAR: 2022**

INSTRUCTIONS

1. This paper consists of sections A and B
2. Answer all questions in section A and B
3. All necessary working and answer for each questions must be shown clearly
4. NECTA mathematical table and non-programmable calculator may be used
5. Cellular phones and any unauthorized materials are not allowed in the examination room.
6. Use $\pi = 3.14$

SECTION A (60Marks)

Answer all questions in this section

1. a) Mangoes are to be exactly divided into groups of 20, 30 or 36. What is the smallest number of mangoes required?

   b) Anna was given 60,000 shillings by her mother she spent 35 percent of the money to buy shoes and 10 percent of the remaining money to buy books. How much money remained?

2. a) If $\log y + 2\log(3x + 1) = 1$. Express y in terms of x

   b) Given a recurring decimal $0.9\dot{6}$ write it as a fraction.

3. a) Simplify $\frac{\sqrt{7}}{\sqrt{7}+\sqrt{5}}$ by rationalizing the denominator

   b) A box contains 4 defective transistors and 12 good transistors.If two transistors are drawn from the box without replacement. What is the probability that

   (i) The first is good and the second is defective

   (ii) One of the transistordrawn is good and the other is defective.

4. a) There are 48 men at a meeting of whom 24 are teachers, 36 are parents and 16 are both teachers and parents. By using Venn diagram, find the number of men who are neither a teacher nor a parent.

   b) Find the direction cosine of $\underline{c} = 9\underline{i} + 12\underline{j}$, hence show that the sum of the squares of these directions cosine is one.

5. a) Find the equation of the line through the points (4, 6) and the midpoint of (2, 4) and (10, 4)

   b) The length of two sides of a triangle are 16cm and 20cm . Find the area of the triangle if the included angle is 3

6. a) In the preparation e can fill 1500 bottle in 45 minutes. How many bottle will it fill in $4^1/_2$ hours ?

   b) The mass (m) which can be supported by a beam varies directly with the breath (b) and inversely with the length (l) . If a beam of breath 2m and length 15m can support a mass of 200kg. What mass can be supported by a beam which is 3m broad and 20m long?

7. a) John wants to invest a certain sum of money so that its value after 3 years will be 100,000/= shillings.How much amount of money should be invested at 5% per annum compound interest?

   b) Study the given trial balance and answer questions that follow:

Trial Balance as at December 2021

S/N	Details	Amounts(Tshs)	Amount(Tshs)
1.	Cash	185,000.00	
2.	Capital		200,000.00
3.	Purchases	110,000.00	
4.	Sales		104,000.00
5.	Water bills	3,000.00	
6.	Advertising	2,000.00	
7.	Telephone bills	1,000.00	
8.	Salaries	3,000.00	
		304,000.00	304,000.00

Prepare the balance sh

8. a) The first term of an arithmetic progression is 12 and the common difference is 10 . Find n^{th} term.

   b) A farmer wants to plant 6 mangoes seedling in a row at a fixed interval of 7metres. Determine the length of the row.

9. a) A ladder leans against a vertical wall . If the ladder reaches 12m up the wall and its foot is 9m from the base of the wall, find the length of the ladder.

   b) Given that A and B are complementary angles and sin A = $^3/_5$. Find tan B (*Leave your answer as improper fraction).*

10 .a) Solve the following equation by completing the square method$2x^2 + 10x - 28 = 0$

   b) The difference between two positive numbers is 7 if their product is 30. Find the numbers.

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

11. The number of patients who attended maternity clinic daily in June 2020 in a certain town was recorded

    51 61 60 70 75 71 75 70 74 73 72 82 70 71 76 74 68 66 50 68 65 72 69 64 83 63

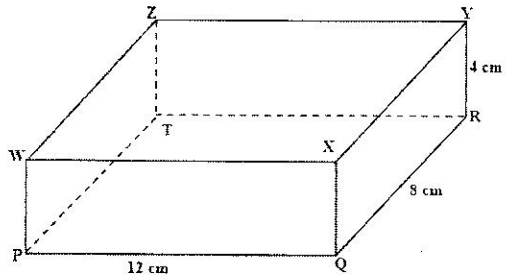
    83 58 80 90 50 89 55 62 61 62

    a) Prepare a frequency distribution table with class size 5 beginning with the number 50 taking into consideration that both lower limit and upper class limit are inclusive

    b) Calculate the mean and mode from the frequency distribution table prepared in (i) above by using assumed mean from the class mark of the modal class.

    c) Draw a cumulative frequency curve and use it to estimate the median.

12 a) The following figure represents a rectangular prism in which $\overline{PQ}$=12cm, $\overline{QR}$=8cm and $\overline{RY}$=4cm



Find;

(i)The total surface area.

(ii)The angle between the planes PTZW and QRZW

(b) A and B are two points on latitude 70N. Their longitudes are 62°W and 118°E respectively. Calculate the distance in kilometres from A to B if the earth's diameter is 12800km for the following cases

i. Along the great circle route over North Pole
ii. Along the parallel of latitude

13. a) i. Given the matrix $P = \begin{pmatrix} 2 & -3 \\ 5 & 4 \end{pmatrix}$ and $Q = \begin{pmatrix} 9 & 12 \\ -15 & 3 \end{pmatrix}$ Find $2P - \frac{1}{3}Q$

ii. If the matrix $\begin{pmatrix} 4k & 8 \\ 2 & 9k \end{pmatrix}$ is singular, find the possible value of k

b) By using the transformation matrix $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$, Find the image of the point A(-2 , 3) . Hence state the axis in which this point is reflected .

c) Solve the following system of linear equation by using the inverse matrix method

$2x + 3y = 7$
$y = \frac{1}{2}x$

14. (a) Given $f(x) = \begin{cases} x + 2 \; if - 2 > x \\ x^2 + 1 \; if - 2 \leq x \leq 2 \\ 1 \; if \; 2 < x \end{cases}$

i. Sketch the graph of f(x)
ii. from the graph state domain and range

b) A business plans to buy at most 210 sacks of Irish and sweet potatoes .Irish potatoes costs shs 30,000 per sack and sweet potatoes costs shs 5000 per sack. He can spend up to shs 2,500,000 for his Business. The profit on a single sack of Irish potatoes is shs 12,000 and for sweet potatoes is shs 10,000. How many sacks of each type of potatoes the business man will buy in order to realize the maximum profit?