MEBU EXAMINATIONS CONSULT

UGANDA CERTIFICATE OF EDUCATION

MATHEMATICS SEMINAR HELD ON 21ST-SEPTEMBER, 2024 AT KABEI SENIOR SECONDARY SCHOOL-BUKWO DISTRICT, SEBEI SUB REGION

SESSION ONE

FORMAT 456/1

Section A comprises of two compulsory items and **Section B** comprises of Part I and Part II each having two questions and a learner answers one question from part

CONSTRUCT: Appreciates and uses computational skills, analysis, spatial and logical reasoning in making decisions to solve problems in real-life situations.

Item	Area of construct	Topics covered
	SECTION A: compulsory	
Item one	**NUMBERS** Learner appreciates and uses computational skills to solve problems in real-life situations.	Number bases
		Working with integers
		Fractions, percentages and decimals
		Numerical concepts 1 and 2
		Ratios and proportions
Item Two	**PATTERNS AND ALGEBRA** Learner appreciates and uses analysis to solve problems in real-life situations	Sequences and patterns
		Equations of lines and curves
		Algebra 1 and 2
		Mapping and relations
		Inequalities and regions
		Equation of a straight line
		Rectangular Cartesian plane
		Simultaneous equations
		Linear programming
	SECTION B	
	Γ I (choose one question)	
Items 3 and 4	**DATA AND PROBABILITY**	Data collection and presentation

		Graphs
		Set theory
		Data collection and display
	Learner appreciates and uses logical reasoning to solve problems in real life situations	Matrices
		Probability
	Γ II (choose one question)	
Items 5 and 6	**GEOMETRY AND MEASURES**	Geometric construction skills
		Bearings
		General and angle properties of geometric figures
		Reflection
	Learner appreciates and uses spatial reasoning to solve real-life situations	Business arithmetic
		Time and time tables
		Similarities and enlargement
		Circles
		Rotation
		Length and area properties of two-dimensional geometrical figures
		Nets, areas, and volumes of solids
		Trigonometry 1 and 2
		Vectors
		Business mathematics
		Matrix transformation
		Circle properties
		Lines and planes in three dimensions

SECTION A

(Numbers, Patterns and Algebra)

ITEM 1

Iganga Progressive School bought 25 Baroque learner's books and 35 Longhorn learner's books for Ugsh 1350,000 from Jinja bookshop. From the same bookshop, Jinja Modern SS bought 21 Baroque learner's books and 38 Longhorn learner's books from spent Ugsh 130,000 less than Iganga Progressive. But at online bookshop the cost of a Baroque learner's book and longhorn learner's books were 2% less than that at Jinja bookshop. Eden High School purchased their books

from online bookshop and purchased the same number of Baroque and Longhorn learner's books as Iganga Progressive School.

Task

a) As a student of mathematics help Iganga Progressive and Jinja Modern SS to find out the price of each learner's book at Jinja bookshop.
b) What is the difference in the amount spent by Eden High school and Iganga Progressive School?

ITEM 2

Jinja Modern SS hired a bus and a minibus to transport students to a study tour. Each trip by the bus costs Shs. 40,000 and that of the minibus costs Shs. 25,000. The bus has a capacity of 42 students and the minibus 14 students. All the 126 students contributed a total of Shs. 200.000. The minibus had to make more trips than the bus. If x and y represent the number of trips made by the bus and the minibus respectively:

Task

a) Write down five inequalities representing the above.
b) (i) Plot the inequalities on the same axes
   (ii) By shading the unwanted region, show the region satisfying all the inequalities
c) Use the graph to find the number of trips each vehicle should make so as to send the least amount of money.

SECTION B

Part 1 (Choose one item)

ITEM 3

The headteacher of Jinja Modern SS is thinking of how he can boost the mathematics department of your school. He can either add another teacher or buy more books or both. He has decided that he will do both if the average performance of this year's performance for the 50 students is lower than that of the previous which was 64. He asked the department to give a test and these were the student's marks.

86	30	26	64	87	47	49	26	43	25
45	38	44	56	59	52	76	27	89	46
90	57	73	48	58	89	51	32	56	88
66	62	52	67	69	68	49	92	66	95
54	74	32	39	35	36	69	50	71	92

He also visited the library and found out that previous candidates used three books for their revision; Longhorn, Baroque or Math Clinic. From the Librarian's records it is clear that those who did not use any books failed the subjects greatly. Out of the 50 candidates this year 13 used Longhorn, 20 used Baroque and 17 used Math Clinic. 9 used Longhorn and Math Clinic, 3 used Longhorn and Baroque while 8 used Baroque and Math Clinic only. The records show that 2 used all the three books.

He observed that he should replace one book type of the three with Fountain Publisher since no student read it only alone.

Tasks

a) (i) Help the headteacher group the marks to make an informed decision on the fate of the department and defend it.
   (ii) Display the students' marks in groups on a simple statistics diagram.
b) (i) Help the headteacher identify the book he should replace and explain why
   (ii) Find the probability that a student selected from the class failed.

ITEM 4

Kelan Supplies Limited, A company that supplies food stuffs supplied food items to three schools as follows;

First week;

Jinja SS; 3 bags of posho, 1 bag of rice and 3 bags of cassava

Jinja College; 2 bags of posho and 2 bags of rice.

Jinja Modern SS College; 1 bag of posho, 2 bags of rice and 2 bags of cassava

Second week;

Jinja SS; 3 bags of posho and 2 bags of cassava

Jinja College; 1 bag of posho, 2 bags of rice and 1 bag of cassava

Jinja Modern SS; 3 bags of posho and 1 bag of cassava

The price of posho, rice and cassava is Shs. 20,000, Shs. 30,000 and Shs. 10,000 per bag respectively.

After the two weeks, he wanted to improve his mode of supply, that is to say, supplying what is preferred more by the students in the schools. Therefore, he decided to make a random survey among a selected number of students from all the three schools. All students sampled liked at least one of the foodstuffs. 47 liked cassava (C), 53 liked posho, 23 liked posho only, 10 liked cassava only and 15 liked all the three food stuffs. Forty-five liked rice and 5 liked only rice.

Task

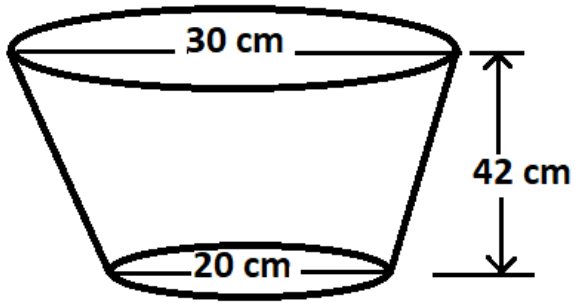
(a) Arrange the amount of foodstuffs bought for each week and the prices using suitable arrays of rows and columns and use them to determine which school spent most in the first two weeks.

(b) (i) Arrange the results of a survey using a suitable statistical diagram.
(ii) Use it to determine the number of students that prefer at least two food stuffs.
(iii) How many students were randomly picked for this survey?
(iv) What is the chance that a student picked at random prefers rice? What conclusion can he draw from this value as per requirements of his survey?

Part II (choose one item)

ITEM 5

Brenda's bucket is in the shape of a frustrum with an open end of diameter 30 cm and a bottom diameter of 20 cm. The bucket which is 42 cm deep is used to fill an empty cylindrical tank of diameter 1.8 m and height 1.2 m



Taking $\pi = \frac{22}{7}$

Brenda has two other similar cans that have different heights, one 6 cm and the other one 9 cm. if the surface area of the larger can is 840 cm^2.

Task

(a) Determine;
i. The capacity of the bucket in litres correct to 3 d.p.
ii. The capacity of the tank in litres correct to 2 d.p.
iii. The number of buckets that must be drawn to fill the tank
(b) Find the surface area of the smaller can correct to 3 d.p.

ITEM 6

Mr. Kasadha is a water engineer who works with Netflix Water Solutions Limited. Every employee in the company is entitled to non-taxable allowances as shown below;

Age of Child	**Allowance (UGX)**
Below 11 years	50,000
11 – 18 years	30,000
Above 18 years	10,000
Hospital insurance	50,000
Transport refund	80,000

Mr. Kasadha has two sons with 12 years and 15 years and earns a gross income of UGX 150 million a year but the accountant of the company had to remit Mr. Kasadha's tax to the URA.

Task

Monthly income (UGX)	Tax rate
0 to 1,000,000	11%
1,000,000 to 2,000,000	23%
2,000,000 to 3,000,000	26%
3,000,000 to 4,000,000	31%
4,000,000 to 5,000,000	34.6%
5,000,000 and above	36.7%

(i) Following the tax rates above help the accountant to compute Mr. Kasadha's income tax expressing it in percentages correct to 3 d.p.

(ii) After the accountant analyzing Mr. Kasadha's income, what was take home pay of Mr. Kasadha for each month?

END

EXPECTED RESPONSES

Let baroque learner's book be X and Long horn learner's book be y

School	Baroque	Long horn	Total
Iganga Progressive	**25**	**35**	**135,000**
Jinja Modern s.s	**21**	**38**	**122,000**

$25x + 35y = 1{,}350{,}000$ ……. (1)

$21x + 38y = \ 1{,}220{,}000$ …… (2)

$21\ eqn\ 1 - 25\ eqn\ 2$

$525x + 735y = 28{,}350{,}000$

$-\ \underline{525x + 950y = 30{,}500{,}000}$

$-215y \ = \ -2{,}150{,}000$

$y = shs\ 10{,}000$

Using equation 1

$25x + 35(10{,}000) = 1350{,}000$

$25x = 1350{,}000 - 350{,}000$

$25x = shs\ 1{,}000{,}000$

$x = Shs\ 40{,}000$

At Jinja bookshop baroque learner's book is Shs 40,000 and long horn learner's book is Shs 10,000

(b) Iganga Progressive s.s = $Ugshs\ 1{,}350{,}000$

Eden High School

Baroque learner's book

(100% - 2%) of Shs 40,000

$\frac{98}{100} \times 40{,}000$

= Shs 39,200

Long horn learner's book

(100% - 2%) of Shs 10,000

$\frac{98}{100} \times 10{,}000$

=Shs 9,800

$25x + 35y$

$=(25 \times 39{,}200) + (35 \times 9{,}800)$

$= 980{,}000 + 343{,}000$

$=Shs\ 1{,}323{,}000$

Amount difference between Eden high school and Iganga Progressive

$$shs\ 1{,}350{,}000$$

$$-\ Shs\ 1{,}323{,}000$$

$$Shs\ 27{,}000$$

The difference in amount between Eden High School and Iganga Progressive is $Shs\ 27{,}000$

ITEM TWO

Inequality for the cost

$\frac{4000x}{5000} + \frac{25000y}{5000} \leq \frac{200000}{5000}$

$8x + 5y \leq 40$

Inequality for the number of students

$\frac{42x}{14} + \frac{14y}{14} \geq \frac{126}{14}$

Note: We use $\geq$ because all students had to go

$3x + y \geq 9$

Inequality for the number of trips

$x < y$

The other 2 inequalities are:

$x \geq 0$

$y \geq 0$

Showing that the bus and minibus were hired to transport the students.

The inequalities;

$8x + 5y \leq 40$

$3x + y \geq 9$

$x < y$

$x \geq 0$

$y \geq 0$

b) (i) The lines to be plotted are for;

$8x + 5y = 40$

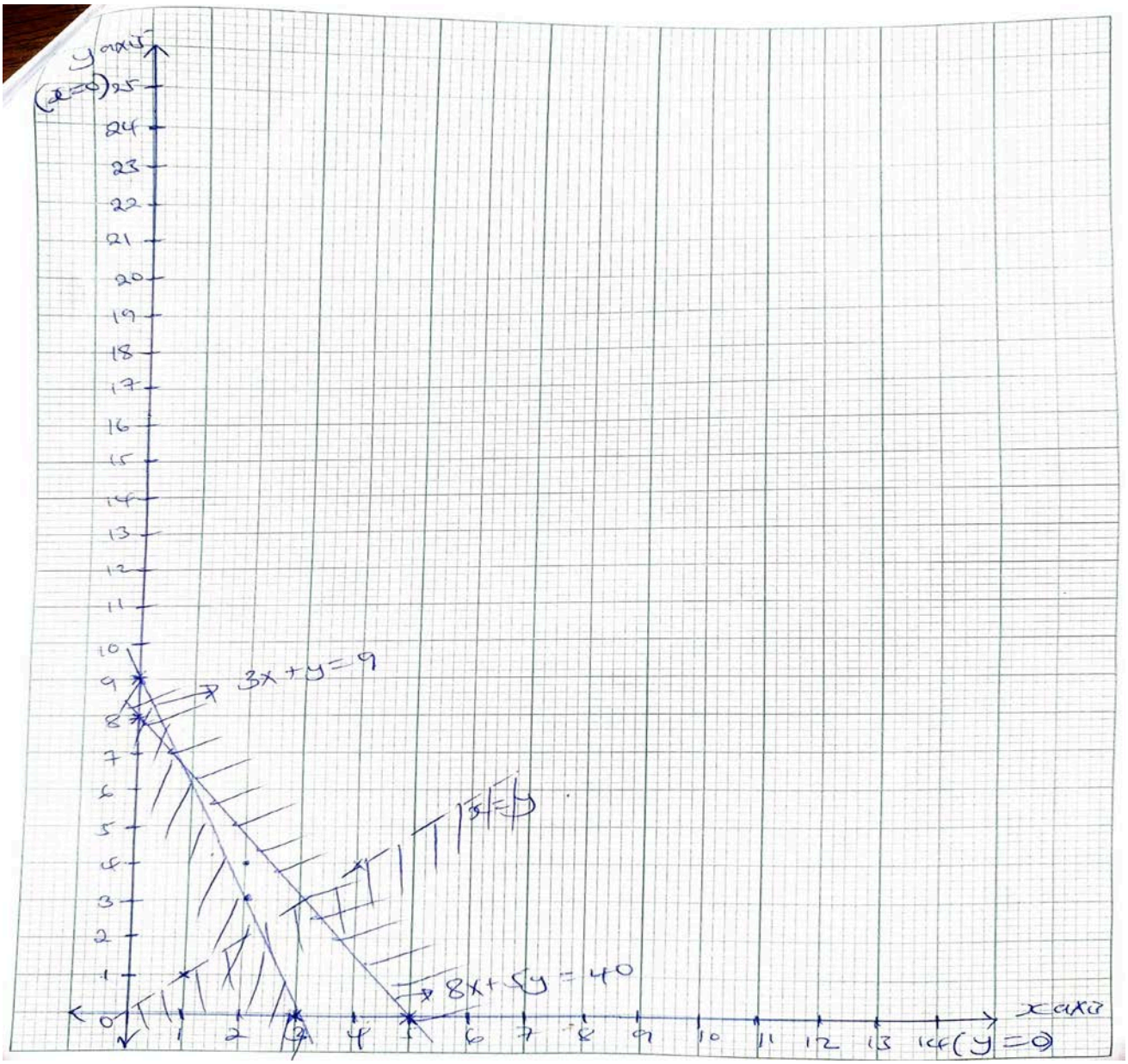
x	0	5
y	8	0

$3x + y = 9$

x	0	3
y	9	0

$x = y$

$(1,1) \ \ and \ (4,4)$



(ii) By shading the unwanted region, show the region satisfying all the inequalities.

c) Use the graph to find the number of trips each vehicle should make so as to spend the least amount of money

From the feasible region our integral values are$(2,3)$ and$(2,4)$

$$(2,3) = 2 \times 40{,}000 + 3 \times 25{,}000$$

$$= 80{,}000 + 75{,}000$$

$$= shs\ 155{,}000$$

$$(2,4) = 2 \times 40{,}000 + 4 \times 25{,}000$$

$$= 80{,}000 + 100{,}000$$

$$= shs\ 180{,}000$$

The bus should make 2 trips and the minibus 3 trips so as to spend the least amount of money

ITEM 3

Marks	Tallies	F	Cf	Class limits
20 - 29	////	4	4	19.5 - 29.5
30 - 39	~~////~~ //	7	11	29.5 - 39.5
40 - 49	~~////~~ ///	8	19	39.5 - 49.5
50 - 59	~~////~~ ~~////~~	10	29	49.5 - 59.5
60 - 69	~~////~~ ///	8	37	59.5 - 69.5
70 - 79	////	4	41	69.5 - 79.5
80 - 89	~~////~~	5	46	79.5 - 89.5
90 - 99	////	4	50	89.5 - 99.5
		$\sum f = 50$		

$$Modal\ mark = lcb + \left[\frac{d1}{d1 + d2}\right]c$$

$$= 49.5 + \left[\frac{2}{2 + 2}\right] \times 10$$

$$= 49.5 + \frac{2}{4} \times 10$$

$$= 49.5 + 5$$

$$= 54.5$$

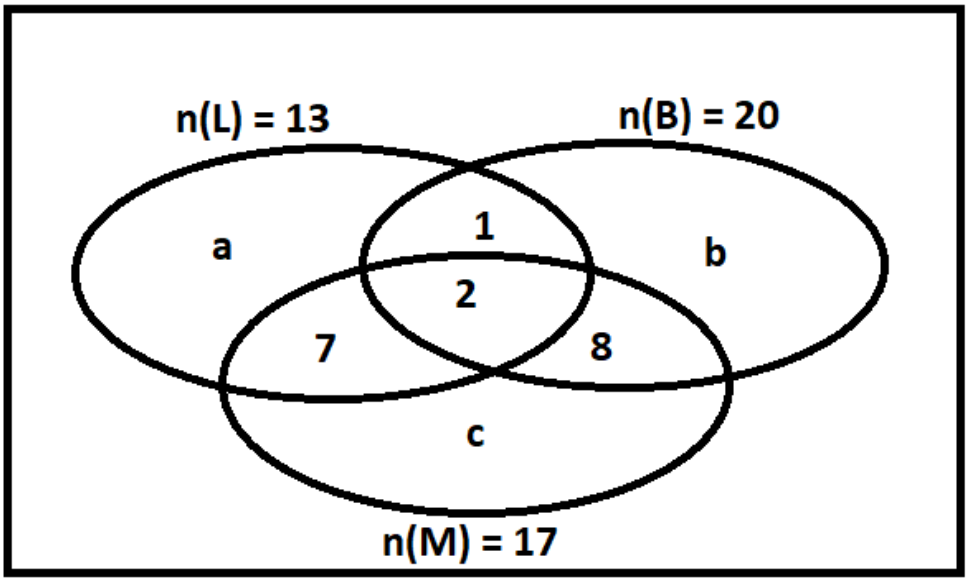
The head teacher may not bring a new teacher in the department since most of the students are above the average mark(50%)

b) (i) $n(\delta) = 50$ $n(LnM) = 9$

$n(L) = 13$ $n(LnB) = 3$

$n(B) = 20$ $n(BnM)only = 8$

$n(M) = 17$ $n(LnBnM) = 2$



$n(L)only$ $n(B)only$ $n(m)only$

$a + 10 = 13$ $b + 11 = 20$ $c + 17 = 17$

$a = 3$ $b = 9$ $c = 0$

It should be Maths clinic since no student read it alone

(ii) $Probability = \frac{n(E)}{n(S)}$

$= \frac{19}{50}$

ITEM FOUR

1st week

School	Posho	Rice	Cassava
Jinja S.S	**3**	**1**	**3**
Jinja College	**2**	**2**	**0**
Jinja modern s.s	**1**	**2**	**2**

2nd week

School	Posho	Rice	Cassava
Jinja S.S	**3**	**0**	**2**
Jinja College	**1**	**2**	**1**
Jinja modern s.s	**3**	**0**	**1**

1st week	**2nd week**	**Cost**
$\begin{pmatrix} 3 & 1 & 3 \\ 2 & 2 & 0 \\ 1 & 2 & 2 \end{pmatrix}$	$\begin{pmatrix} 3 & 0 & 2 \\ 1 & 2 & 1 \\ 3 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 20,000 \\ 30,000 \\ 10,000 \end{pmatrix}$

1st Week

$$\begin{pmatrix} 3 & 1 & 3 \\ 2 & 2 & 0 \\ 1 & 2 & 2 \end{pmatrix}\begin{pmatrix} 20,000 \\ 30,000 \\ 10,000 \end{pmatrix}$$

$$= \begin{pmatrix} 3 \times 20,000 + 1 \times 30,00 + 3 \times 10,000 \\ 2 \times 20,000 + 2 \times 30,000 + 0 \times 10,000 \\ 1 \times 20,000 + 2 \times 30,000 + 2 \times 10,000 \end{pmatrix}$$

$$= \begin{pmatrix} 60,000 + 30,000 + 30,000 \\ 40,000 + 60,000 + 0 \\ 20,000 + 60,000 + 20,000 \end{pmatrix}$$

$$= \begin{pmatrix} 120,000 \\ 100,000 \\ 100,000 \end{pmatrix}$$

2nd Week

$$\begin{pmatrix} 3 & 0 & 2 \\ 1 & 2 & 1 \\ 3 & 0 & 1 \end{pmatrix}\begin{pmatrix} 20,000 \\ 30,000 \\ 10,000 \end{pmatrix}$$

$$= \begin{pmatrix} 3 \times 20,000 + 0 \times 30,000 + 2 \times 10,000 \\ 1 \times 20,000 + 2 \times 30,000 + 1 \times 10,000 \\ 3 \times 20,000 + 0 \times 30,000 + 1 \times 10,000 \end{pmatrix}$$

$$= \begin{pmatrix} 60,000 + 0 + 20,000 \\ 20,000 + 60,000 + 10,000 \\ 60,000 + 0 + 10,000 \end{pmatrix}$$

$$= \begin{pmatrix} 80,000 \\ 90,000 \\ 70,000 \end{pmatrix}$$

Jinja SS = Shs. 120,000 + Shs. 80,000

= Shs. 200,000

Jinja College = Shs. 100,000 + Shs. 90,000

= Shs. 190,000

Jinja Modern = Shs. 100,000 + Shs. 70,000

= Shs. 170,000

∴ Jinja SS spent the most amount of Shs. 200,000 in the first two weeks

b (i) n(C) = 47

n(P) = 53

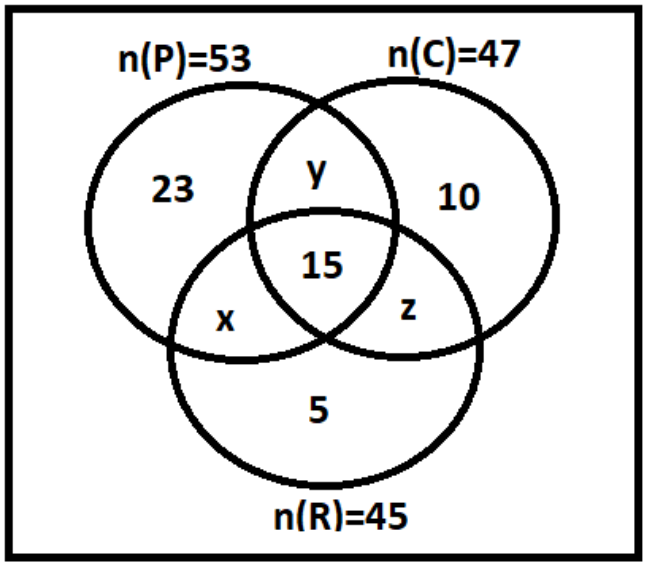
n(P) only = 23

n(C) only = 10

$n(P \cap R \cap C) = 15$

n(R) = 45

n(R) only = 5



(ii) $x + y + 38 = 53$

$x + y = 15$ …….. (1)

$y + z + 25 = 47$

$y + z = 22$ …….. (2)

$x + 15 + z + 5 = 45$

$x + z = 25$ …….. (3)

Eqn 1 – Eqn 3

$$-\left|\begin{matrix} x + y = 15 \\ x + z = 25 \end{matrix}\right.$$

$y - z = -10$ …… (4)

Eqn 2 – Eqn 4

$$y + z = 22$$

$$- \quad y - z = -10$$

$$2z = 32$$

$z = 16$

For Eqn 4

$y - 16 = -10$

$y = 16 - 10$

$y = 6$

Eqn 3

$x + 16 = 25$

$x = 25 - 16$

$\underline{x = 9}$

$x + y + z$

$= 9 + 6 + 16$

$= 31$ Students

$31 + 15$

$= 46$ Students

(iii) $= 23 + 10 + 5 + 9 + 6 + 16 + 15$

$= 38 + 46$

$= 84$ Students

∴ 84 students were picked for the survey

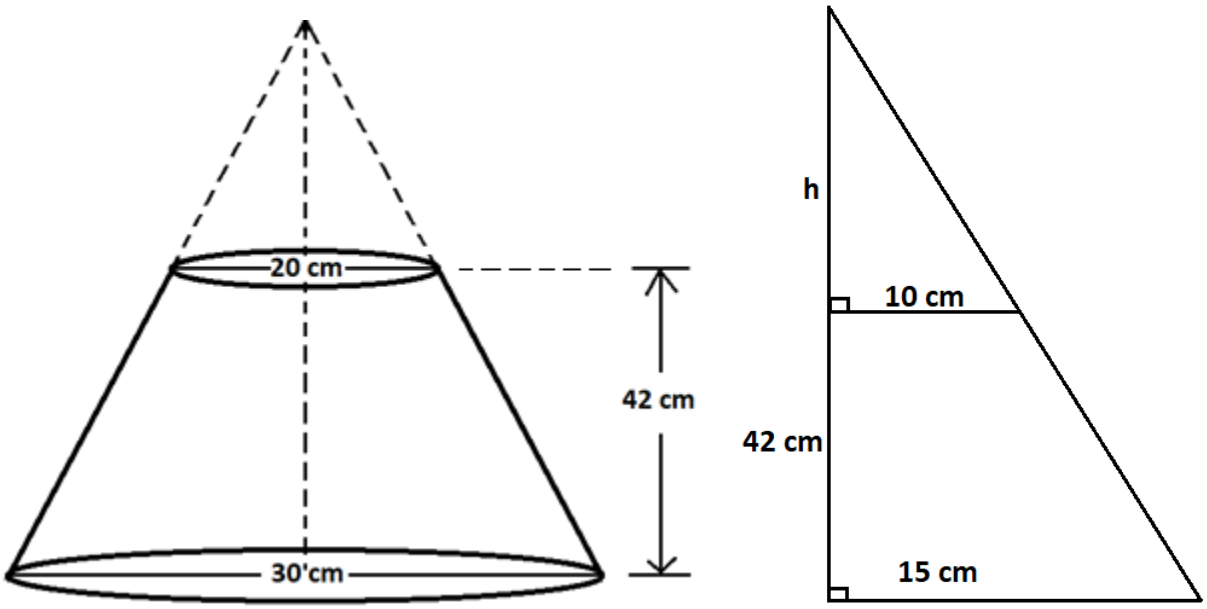
(iv) Probability $= \frac{n(E)}{n(S)}$

$= \frac{45}{84}$

∴ More than half of the students like rice

ITEM 5

(a)



$$\frac{h}{h+42} = \frac{10}{15}$$

$$15h = 10(h+42)$$

$$15h - 10h = 420$$

$$\frac{5h}{5} = \frac{420}{5}$$

$$h = 84\ cm$$

∴ Volume of the smaller cone

$$V = \frac{1}{3}h\pi r^3$$

$$V = \frac{1}{3} \times 84 \times \frac{22}{7} \times (10)^3$$

$$V = \frac{1{,}848{,}000}{21}$$

$$V = 88{,}000\ cm^3$$

Volume of the big cone

$$V = \frac{1}{3}h\pi r^3$$

$$V = \frac{1}{3} \times 126 \times \frac{22}{7} \times (15)^3$$

$$V = 445{,}500\ cm^3$$

Volume of the bucket = Volume of the big cone – Volume of the small cone

$= 445{,}5000\ cm^3 - 88{,}000\ cm^3$

$= 357{,}500\ cm^3$

But capacity $= \frac{Volume}{1000\ cm^3}$

$= \frac{357{,}500}{1000}$

$= 357.5$ Litres

(ii) Volume of the cylinder $= \pi r^2 h$

$= \frac{22}{7} \times (90)^2 \times 120$

$= 3{,}054{,}857.143\ cm^3$

Capacity $= \frac{Volume}{1000\ cm^3}$

$= \frac{3{,}054{,}857.143}{1000}$

$= 3{,}054.86$ Litres (2dp)

(iii) Number of buckets that must be drawn to fill the tank $= \frac{3{,}054.86}{357.5}$

$= 8.545$ Buckets (3dp)

∴ 8.545 buckets must be drawn to fill the tank

(b) L.S.F $= \frac{New\ length}{Original\ length}$

L.S.F $= \frac{9\ cm}{6\ cm}$

L.S.F $= 1.5$

A.S.F $= (L.S.F)^2$

$= (1.5)^2$

A.S.F $= 2.25$

Using A.S.F $= \frac{A^I}{A}$

$2.25 = \frac{840}{A}$

$A = \frac{840}{2.25}$

$A = 373.333\ cm^2$ (3dp)

∴ The surface area of the smaller can is 373.333 cm^2

ITEM 6

Monthly income $= \frac{150,000,000}{12}$

= Ug Shs. 12,500,000

Total allowances

Children $= 2 \times 30,000$ = 60,000

Hospital insurance = 50,000

Transport refund = + 80,000

190,000

Taxable income = Gross Salary – Total allowances

= Ug Shs. 12,500,000 – Ug Shs. 190,000

= Ug Shs. 12,310,000

Monthly income (UGX)	**Income tax**
0 to 1,000,000	$\frac{11}{100} \times 1,000,000 = 110,000$
1,000,000 to 2,000,000	$\frac{23}{100} \times 1,000,000 = 230,000$
2,000,000 to 3,000,000	$\frac{26}{100} \times 1,000,000 = 260,000$
3,000,000 to 4,000,000	$\frac{31}{100} \times 1,000,000 = 310,000$
4,000,000 to 5,000,000	$\frac{34.6}{100} \times 1,000,000 = 346,000$
5,000,000 to 12,310,000	$\frac{36.7}{100} \times 7,310,000 = 2,687,770$

Total Income tax = 110,000 + 230,000 + 260,000 + 310,000 + 346,000 + 2,682,770

= Ug Shs. 3,938,770

Percentage income tax $= \frac{3,938,770}{12,310,000} \times 100$

= 31.997% (3 dp)

(ii) Net income = Ug Shs. 12,310,000 – Ug Shs. 3,938,770

= Ug Shs. 8,371,230

END

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MATHEMATICS SEMINAR HELD ON 21ST-SEPTEMBER, 2024 AT KABEI SENIOR SECONDARY SCHOOL-BUKWO DISTRICT, SEBEI SUB REGION

SESSION TWO

SECTION A

ITEM ONE (20 scores)

Nambi is a market vender in Nakasero market. She realizes that her customers prefer buying tomatoes in small quantities to large amounts and so she decides to re-package her tomatoes into heaps of four. One day, she bought nine heaps of tomatoes which had eight tomatoes each from the market at a cost of Ugsh. 2000 per heap and was given a discount of 5%. She decides to sell her heaps of four tomatoes at Ugsh. 1200. Each and hence wants to find out how much gross profit she will earn from all her heaps. She further intends to visit Kidepo national Game Park in November 2024. Her father visited the same tourism center last November 2023 with 3 children and spent Ugsh. 17000. on entrance ticket. Ngambo and his wife visited the same park in June 2024 with their son James and spent Ugsh. 14000. Nambi plans to buy entrance tickets for herself, husband and five children and hence needs to know how much she will need. If the park charges are adjusted every after five years.

Support material.

Task. You are required to help Nambi know how much;

a) Gross profits will she earn from her heaps after re-packaging
b) Money will she spend in total to buy the tickets she needs.

ITEM TWO (20 scores)

Amanang Senior secondary school bought 25 Mathematics textbooks and 35 English books for Ugsh 135,000 from Mbale General Bookshop. From the same bookshop, Mbale S.S bought 21 Mathematics textbooks and 38 English textbooks and spent Ugsh 13,000 less than Amanang Senior secondary school. However, in Soroti cheap bookshop the cost of a Mathematics text book was 5% less and that of an English textbook was 5% more than in Mbale General Bookshop. Soroti S.S bought the same number of Mathematics textbooks and English textbooks as Amanang Senior secondary school in Soroti cheap bookshop.

Task

a) As a senior four student, help Amanang Senior secondary school and Mbale S.SS to find out the price of each item in Mbale general bookshop.
b) What is the difference in the amount spent by Soroti S.S and Amanang Senior secondary school?

SECTION B

Part 1 (Answer only one item from this part.)

ITEM THREE. (20 Scores)

Wilson is a business man who deals in an agricultural produce business. He visited four markets in a week two of the month of September 2024.

In Nakasero market (**N**), he bought 3 bags of beans, 5 bags of maize, 10 bags of potato and 3 bags of millet.

In Kalerwe market (K), he bought 1 bag of beans, 4 bags of potatoes and 2 bags of millet.

In Jinja market (J), he bought 4 bags beans, 3 bags of maize, 6 bags of potatoes and 1 bag of millet.

In Masaka market (M) he bought 5 bags of beans and 1 bag of maize.

Wilson bought each bag of beans at Shs. 45000, a bag of maize at Shs. 30000, a bag of potatoes at Shs. 15000 and a bag of millet at Shs. 50000.

However, since he is a business man, he later sold off all the produce he had bought at Shs. 50000 per bag of beans, Shs. 35000 per bag of maize, Shs. 18000 per bag of potatoes and 55000 per bag of millet.

Task

a) Assist Wilson to summarize the above information in matrix form.
b) Using your knowledge of matrix multiplication help him to know the amount of money spent on the produce in each market.
c) With clear evidence, help him to know whether he made a loss or profit.

ITEM FOUR. (20 scores)

Item 4

Mr. Byansi Uman is a very rich man in Mbale city where he has constructed 36 houses. He wants to paint his houses by either Green, White or Black colors. Of these, 10 houses must have to be painted with Green colour and 6 houses must be painted by black colour. The 5 houses must be painted with green and white, 8 white and black and 4 houses must be painted with green and black.

All houses which are painted white are three more than those which are painted black.

Task

a) Determine the number of houses that were pointed with all the three different colors.
b) Determine the number of houses painted with at least one of each of the three colors.

c) If the house is picked at random, what is the probability that it is a black or white only?

PART II (Answer only one item from this part)

ITEM FIVE (20 Scores)

A ship leaves Mwanza port and sails on a bearing of 050^0 heading towards port bell. Two terrorist groups ADF and Al-Shabab sail from port Kisumu to intercept the ship. ADF terrorist group sails such that it covers the shortest distance possible.

Al-Shabab group sails on a bearing of 020^0 to port bell at a speed of 25km/hr. The bearing of Kisumu port from Mwanza port is 100^0 and the distance between these two ports is 300km. The UPDF was alerted in time and hid at port bell in a rectangular block building which had Length of 2cm more than the width and with a height of l cm more than two times the width and have a volume of $624cm^3$.

Task

a) Determine the position of the three ports and hence describe the direction of Kisumu port from port bell.
b) For how long would the UPDF had to wait and ambush the Al-Shabab group at port bell?
c) With clear evidence based on mathematical calculation, what do you think was the total surface area of the rectangular block building?

ITEM SIX (20 Scores)

In a Chemistry practical examination scheduled to begin shortly, the laboratory attendant discovered that there are some chemical reagents missing, yet very crucial for the smooth running of the examination. The examination cannot start unless these reagents are available. Okao is sent to quickly go and get them from a certain supplier in Mbale town. Okao cycles as he leaves the school, and takes 2 hours to reach Mbale town, 10km away. In Mbale, he rests for 30minutes and later returns to school at a steady speed of $8kmh^{-1}$. When Okao delays, Kakembo who happens to be in Mbale, is given a phone call to help pick the reagents and deliver them quickly, Kakembo leaves Mbale town at the same time as Okao, towards school, travelling at $2.5kmh^{-l}$ but midway in his journey, Kakembo discovers that he had been given a package containing reagents for a different subject. He thus decides to return back the package to the supplier. He returns back to Mbale town at a steady speed of 4 kmh^{-l}

Task:

Using a scale of l cm to represent 15 minutes on the horizontal and l cm to represent 0.5km on the vertical axes respectively,

a) Draw distance - time graphs to represent the two different journeys of the men.
b) How far from Mbale town did the two men by pass each other on the return journey?
c) Determine Kakembo's average speed for the whole journey if he travels nonstop.

MEBU EXAMINATIONS CONSULT

UGANDA CERTIFICATE OF EDUCATION

MATHEMATICS SEMINAR HELD ON 21ST-SEPTEMBER, 2024 AT KABEI SENIOR SECONDARY SCHOOL-BUKWO DISTRICT, SEBEI SUB REGION

SESSION THREE

Answer all items.

Item 1

A business man imports smart phones of Iphone, Techno and Nakia from Japan in the ratio of 2:3:4, it is clear that in this month of January 2024, he intends to bring in enough 6 cartons of Techno. Every imported carton is subjected to an import tax duty of Us dollar ($) 10 and every carton contains 24 smart phones. He buys an Iphone and Techno at Japanese yen (¥) 9,828 and 2292 respectively. The cost of a nokia phone is $^{3}/_{2}$ times the cost of a Techno phone. A discount of 5% is offered for every 4 cartons of Iphone bought and he was charged Japanese yen (¥) 318.5 for every carton of smart phone bought as the shipping cost.

The man intends to make profit of UGX 25.6m, 14.4m and 28.8m on Iphone, Techno and Nokia phones after selling them off in Uganda respectively.

When he was still in Japan, he met his friend Ali who always goes to Japan after every 4 months and they agreed to talk about a new business model when they meet again in Japan. The man often goes to Japan after every 3 months.

Hint: 1 ¥ = UGX 30.5

1 $ =UGX 3580

Task

a). Help the business man to know how much in UGX.

(i). Import tax duty he was to pay (3)

(ii).He is to spend on buying the smart phones altogether. (6)

(iii) Will be the sales from the Iphones, Techno and Nokia phones in order to make the intended profit.
(7)

b). Which month will they meet again to talk about the new business model. (4)

Item 2

A school hired a taxi and a coaster to take all students to Kasenyi fish landing site for a field work. A taxi carries 14 students while a coaster carries 21 students. The head teacher suggests that the number of trips made by the coaster must be exceed those made by the taxi. He also makes it clear that the taxi should not make more than 5 trips while the coaster must make at least a trip. The trip made by taxi costs shs 126000 while that by the coaster costs shs 168,000.

At the trip, every student needed to get a plate of food and a bottle of water. 3 plates of food and 4 bottles of water were sold at shs 27125 while 4 plates of food and 3 bottles of water were sold at shs 35000.

Task

a). Help the head teacher to know the number of trips each vehicle must make in order to minimize the expense.
(12)

b). How much did the school spend on eatables for all the students. (8)

SECTION B

This section has two parts; 1 and 11

Part 1

Answer only one item

Item 3.

The government of Uganda wants to promote any of Lusoga(L), luganda(U) or Kiswahili (K) as the national language. For the language to be made a national language, atleast 23% of the people in a given community must be speaking only that language. A study was made and it was discovered that 5 people in Kikono village speaks Acholi only and this was 2 less than those that spoke all the three languages, 43 of the members were speaking lusoga, 37 were speaking luganda while 19 were speaking Kiswahili only.

The number of members who were speaking both Kiswahili and Luganda only was equal to those that spoke both lusoga and luganda only and this was a third those that spoke luganda only. From the village 16 members spoke both lusoga and Kiswahili.

Task

a). Help the government to know the language that they can promote to be a national language.

b). What is the probability that a member chosen at random spoke almost one language.

Item 4

Uganda medical store wishes to equip Jinja regional referral hospital with a CBC Scan that will help in complete blood counting in order to overcome the problem of blood anemia, since it is not noted that for a patient to

be given blood, ac BC test must first be done and the HGB should be less than 6 units. The machine will be given if the average number of patients that were asked to do the CBC scan is at least 45 in the past 40 days.

The numbers of patients were as shown below

61	45	38	55	33	52	25	37
27	46	31	36	29	46	57	42
38	58	50	34	53	49	54	34
63	42	45	32	48	41	49	27
44	48	51	31	52	41	44	36

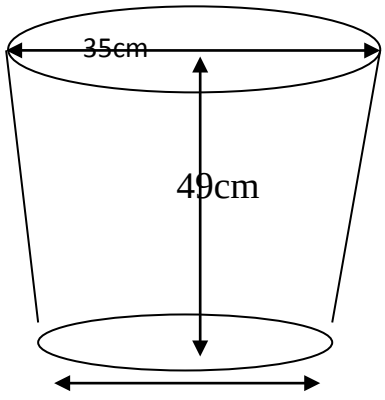
It is also noted that 75% of the patients that did the scan needed blood transfusion and 25% died following anemia.

a) Help the Uganda medical store to decide if to give the hospital the CBC scan machine.

b) Using statical illustration, find out how many people were given blood and how many died.

PART II

Chemutai owns a drink making company. He recently received an order from his customer to make him drinks by mixing lemon, apples and oranges. He is to mix the fruit juice in litres in the ratios of 3:2:2 respectively. The customer needs 420 litres of drinks altogether and he is to pack them in buckets as shown below



Every litre of lemon juice, apple juice and orange juice costs shs 1500, shs 4500 and 2000 respectively.

In preparation for any emergency order, Chemutai buys a cylindrical tank of diameter 3.6m and a height 2.8m which he will fill with juices.

Task

a) How much did he use to produce the required quantity of juice?

b) How many full buckets will he pack for his customers?

c) How many buckets will be powered in the tank to the full capacity of the tank?

Item 6

Amoti started moving from Jinja at 7:00am heading to Soroti a distance of 340km a way. After moving a distance of 80km, he had reached Tirinyi and a car got a mechanical problem. It took mechanic 45 minutes to finish the repairing and it was at 8:45 am when he resumed with the journey. He used the same speed and reached Mbale at 10:00am. He stopped a half an hour to get some break first. He then realized that he was getting late and he had to immediately start the vehicle.

Due to high speed that he was using, he was stopped by the traffic officers after covering half of the remaining distance in just 45 minutes; it took him 15 minutes to explain to the officers. He then drove his vehicle at 50km/hr for the remaining distance and reached safely in Soroti.

He however needs to explain to his colleges why he delayed since they expected him to be in Soroti at 11:50am. He thinks of an Illustration to clearly show his colleague but cannot develop one.

TASK

a) Help Amoti develop an illustration and use it to explain why he delayed.

b) At what time did he reach kumi a distance of 40km from Mbale

END