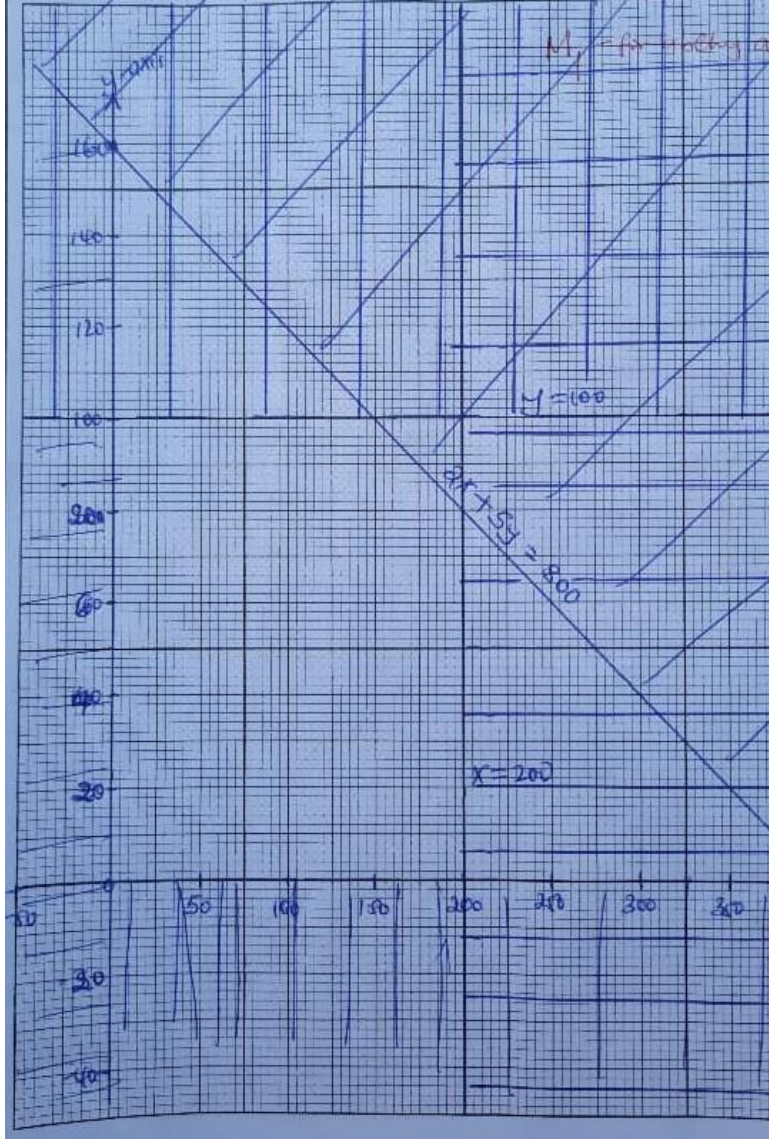


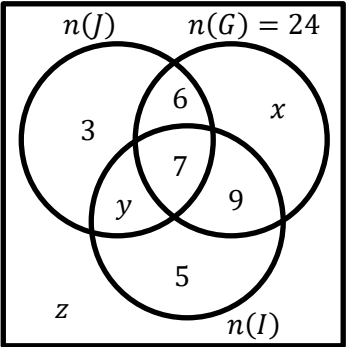
UCE 456/1 MATHEMATICS

SCORING GRID

Item	Solution	Score	Comment																						
1 (a) (i)	<p>Let the actual area of the swamp be p</p> <table><thead><tr><th>Map</th><th>Ground</th></tr></thead><tbody><tr><td>1cm</td><td>= 250,000cm</td></tr><tr><td>$1cm^2$</td><td>= $6.25 \times 10^{10}cm^2$</td></tr><tr><td>$7.36cm^2$</td><td>= $7.36 \times 6.25 \times 10^{10}cm^2$</td></tr><tr><td></td><td>= $4.6 \times 10^{11}cm^2$</td></tr><tr><td>1km</td><td>= 100,000 cm</td></tr><tr><td>$1km^2$</td><td>= $1 \times 10^{10}cm^2$</td></tr><tr><td>p</td><td>= $4.6 \times 10^{11}cm^2$</td></tr><tr><td>$\frac{p \times 10^{10}}{10^{10}}$</td><td>= $\frac{4.6 \times 10^{11}}{10^{10}}$</td></tr><tr><td></td><td>$p = 46km^2$</td></tr><tr><td></td><td>\therefore The actual area of the swamp is $46km^2$</td></tr></tbody></table>	Map	Ground	1cm	= 250,000cm	$1cm^2$	= $6.25 \times 10^{10}cm^2$	$7.36cm^2$	= $7.36 \times 6.25 \times 10^{10}cm^2$		= $4.6 \times 10^{11}cm^2$	1km	= 100,000 cm	$1km^2$	= $1 \times 10^{10}cm^2$	p	= $4.6 \times 10^{11}cm^2$	$\frac{p \times 10^{10}}{10^{10}}$	= $\frac{4.6 \times 10^{11}}{10^{10}}$		$p = 46km^2$		\therefore The actual area of the swamp is $46km^2$	I_1 I_1 I_1 I_1 M_1 M_1	Scale Squaring Multiplying Squaring km^2 Manipulation of quotient Correct Ans 46
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(ii)	<p>Decision: I will use excavator vehicle</p> <p>Reason: Because the actual area of the swamp is greater than $40km^2$</p>	A_1 A_1	Correct decision Correct reason																						
(b)	<p>1 operator = 125,000</p> <p>14 operators = $14 \times 125,000$</p> <p>= Ugx 1,750,000</p> <p>1 day = 1,750,000 for operators</p> <p>14 days = $14 \times 1,750,000$</p> <p>= Ugx 24,500,000</p> <p>The operators will be paid Ugx 24,500,000</p>	I_1 M_1 I_1 M_1	Multiplying For 1,750,000 Multiplying For 24,500,000s																						

(c)	<p>Amount given to company = 50,000,000</p> <p>Balance after paying operators = 50,000,000 – 24,500,000 = Ugx 25,500,000</p> <p>My payment = $\frac{40}{100} \times 25,500,000$ = Ugx 10,200,000</p> <p>Maintenance & repair Of vehicles = $\frac{18}{100} \times 25,500,000$ = Ugx 4,590,000</p> <p>Director's payment = 25,500,000 – 14,790,000 = Ugx 10,710,000</p> <p>Difference = 10,710,000 – 10,200,000 = Ugx 510,000</p>	<p>I_1</p> <p>I_1</p> <p>M_1</p> <p>I_1</p> <p>I_1</p> <p>M_1</p> <p>I_1</p> <p>M_1</p>	<p>50,000,000 written in figures.</p> <p>Subtracting</p> <p>Answer 25.5m %</p> <p>multiplication</p> <p>%</p> <p>multiplication</p> <p>Subtraction</p> <p>Subtraction For 510,000</p>
TOTAL		20 SCORES	
2 (a)(i)	<p>Let the length of the ware house be l</p> <p>Width - $(l - 20)$</p> <p>$l(l - 20) = 800$</p> <p>$l^2 - 20l - 800 = 0$</p> <p>$l = \frac{20 \pm \sqrt{(-20)^2 - 4(1)(-800)}}{2(1)}$</p> <p>$l = \frac{20 \pm 60}{2}$</p> <p>Either $l = 40m$ or $l = -20m$</p> <p>\therefore Length = 40m</p> <p>Width = 20m</p> <p>Height = $\frac{1}{4} \times 40$ = 10m</p>	<p>F_1</p> <p>M_1</p> <p>M_1</p> <p>M_1</p> <p>M_1</p>	<p>Formation of equation</p> <p>Solving of equation</p> <p>Solutions to eqn</p> <p>For $l = 40$</p> <p>For $w = 20$</p> <p>For $H = 10$</p>

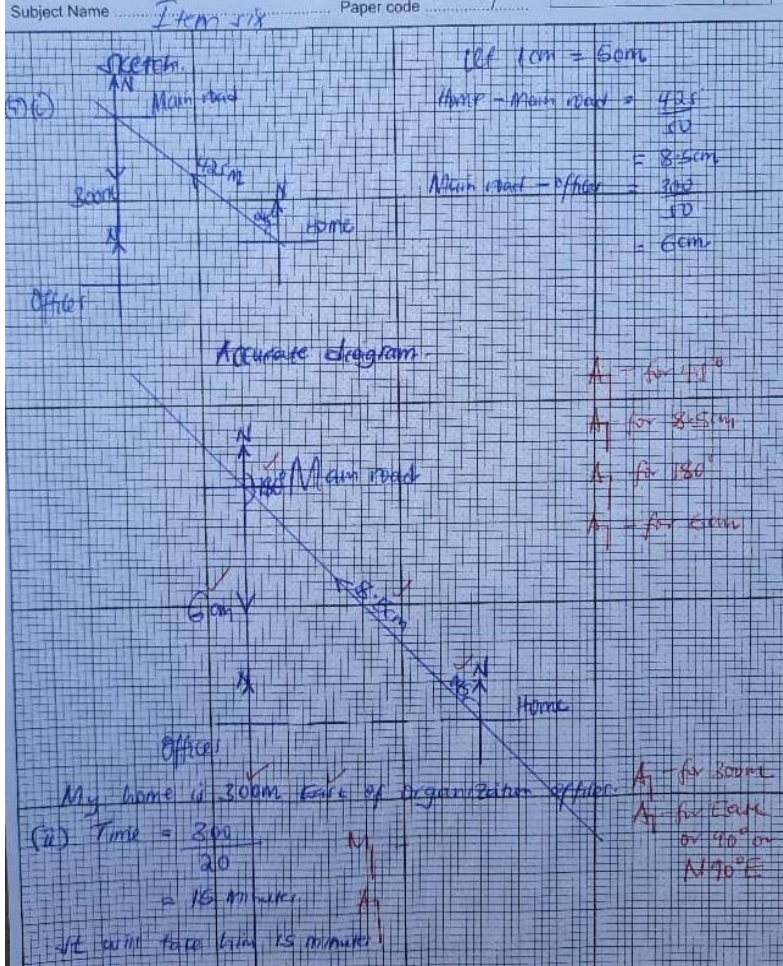
(ii)	<p>Volume = $40 \times 20 \times 10$ $= 8000m^3$</p>	<p>M_1 M_1</p>	<p>Substitution For 8000</p>
b(i)	<p>Let x – Number of type A mattresses y – Number of type B mattresses $x \leq 200$(i) $y < 100$(ii) $20x + 50y \leq 8000$(iii) $2x + 5y \leq 800$</p>	<p>F_1 F_1 F_1</p>	<p>For correct (i) For correct (ii) For correct (iii)</p>
(ii)	<p>$x = 200, y = 100$ $2x + 5y = 800$ When $x = 0, y = 160$ (0,160) When $y = 0, x = 400$ (400,0)</p> 	<p>M_1 M_1 M_1 M_1 M_1 M_1</p>	<p>Labeling axes Line $x = 200$ Line $y = 100$ Line $2x + 5y = 800$ Correct feasible region Shading of $x = 0$ & $y = 0$</p>

(iii)	<p>(200,80)</p> $x + y = 200 + 80$ $= 280$ <p>\therefore 200 mattresses of type A and 80 mattresses of type B will be stored for the warehouse to have highest capacity of mattresses and the highest number of mattresses will be 280</p>	I_1 A_1 A_1	$x + y$ or 200 + 80 For 200 & 20 For 280
TOTAL		20 SCORES	
3 (a)	<p>A Venn diagram showing the analysis of the data</p>  <p> $x + 9 + 7 + 6 = 24$ $x = 2$ $z + 5 + 9 + 2 = 38$ $z = 22$ $22 + 5 + 9 + 2 + y + 3 + 6 + 7 = 58$ $y = 4$ $n(J) = 3 + 6 + 7 + 4$ $= 20$ $n(I) = 5 + 9 + 4 + 7$ $= 25$ $n(G) = 24$ </p> <p>Decision: The company should increase number of vehicles imported from Italy</p> <p>Reason: Because it is the country with highest number of customers</p>	T_1 I_1 I_1 I_1 I_1 I_1 I_1 I_1 A_1 A_1 A_1 A_1	<p>For title</p> <p>For 58 For 24 For 3 For 6 For 7 For 9 For 5</p> <p>Correctly placed in correct position</p> <p>For solving for x, y & z</p> <p>for n(J)</p> <p>for n(I)</p> <p>for correct decision</p> <p>for correct reason</p>

(b)	<p>Probability = $\frac{22}{58}$ = 0.38</p> <p>Decision: Yes, the company will start importing vehicles from china</p> <p>Reason: Because the probability of those who do not like vehicles from any of the three countries is greater than 0.35</p>	<p>A_1</p> <p>A_1</p> <p>A_1</p>	<p>Probability</p> <p>Correct decision</p> <p>Correct reason</p>
(c)	<p>$n(J) + (G) + n(I) = 20 + 24 + 25$ = 69 customers</p>	<p>A_1</p> <p>A_1</p>	<p>Addition</p> <p>Correct Ans</p>
(d)	<p>Number of customers = $3 + 6 + 2 + 22$ = 33</p> <p>Probability = $\frac{33}{58}$</p>	<p>A_1</p> <p>A_1</p>	<p>Obtaining 33</p> <p>Probability</p>
TOTAL		20 SCORES	
<p>4</p> <p>(a)</p>	<p>Matrices showing the purchase and cost of items</p> <p> $\begin{matrix} & \mathbf{L} & \mathbf{S} & \mathbf{P} \\ \text{Margie} & 2 & 3 & 4 \\ \text{Jesca} & 3 & 4 & 2 \end{matrix}$ $\mathbf{2 \times 3}$ </p> <p> $\begin{matrix} \mathbf{L} & (5500) \\ \mathbf{S} & (3700) \\ \mathbf{P} & (350) \end{matrix}$ $\mathbf{3 \times 1}$ </p> <p> $\begin{pmatrix} 2 & 3 & 4 \\ 3 & 4 & 2 \end{pmatrix} \begin{pmatrix} 5500 \\ 3700 \\ 350 \end{pmatrix} = \begin{pmatrix} 11000 + 11100 + 1400 \\ 16500 + 14800 + 700 \end{pmatrix}$ $= \begin{pmatrix} 23500 \\ 32000 \end{pmatrix}$ </p> <p>Margie spent Shs. 23,500 Jesca spent Shs. 32,000</p> <p>Decision: Jesca is the one who went with less money</p> <p>Reason: Because her expenditure is more than the money she went with</p>	<p>T_1</p> <p>I_1</p> <p>L_1</p> <p>I_1</p> <p>L_1</p> <p>A_1</p> <p>A_1</p> <p>A_1</p> <p>A_1</p>	<p>For title</p> <p>Matrix Order</p> <p>Matrix Order</p> <p>Matrix multiplication</p> <p>Correct manipulation</p> <p>For correct decision</p> <p>For correct reason</p>

(b)	A probability tree showing all the possible outcomes	T_1	Title
		I_1	Any correct tree
		I_1	Any other correct tree
	<p><u>Tracy's probability</u></p> $(G_1 \cap R_2) + (G_1 \cap Y_2) + (R_1 \cap G_2) + (R_1 \cap Y_2) + (Y_1 \cap G_2) + (Y_1 \cap R_2)$		
	$= \left(\frac{4}{13} \times \frac{3}{12}\right) + \left(\frac{4}{13} \times \frac{6}{12}\right) + \left(\frac{3}{13} \times \frac{4}{12}\right) + \left(\frac{3}{13} \times \frac{6}{12}\right) + \left(\frac{6}{13} \times \frac{4}{12}\right) + \left(\frac{6}{13} \times \frac{3}{12}\right)$	A_1	Analysis
	$= \frac{108}{156}$ $= \frac{9}{13}$	A_1	Correct prob
	<p><u>Maria's probability</u></p> $(G_1 \cap G_2) + (R_1 \cap R_2) + (Y_1 \cap Y_2)$		
	$= \left(\frac{4}{13} \times \frac{3}{12}\right) + \left(\frac{3}{13} \times \frac{2}{12}\right) + \left(\frac{6}{13} \times \frac{5}{12}\right)$	A_1	Analysis
	$= \frac{48}{156}$ $= \frac{4}{13}$	A_1	Correct prob

	<p><u>Molly's probability</u></p> $(G_1 \cap R_2) + (R_1 \cap R_2) + (Y_1 \cap R_2)$ $= \left(\frac{4}{13} \times \frac{3}{12}\right) + \left(\frac{3}{13} \times \frac{2}{12}\right) + \left(\frac{6}{13} \times \frac{3}{12}\right)$ $= \frac{36}{156}$ $= \frac{3}{13}$ <p>Decision: Tracy won the first prize</p> <p>Reason: Because her probability is the highest</p>	<p>A_1</p> <p>A_1</p> <p>A_1</p> <p>A_1</p>	<p>Analysis</p> <p>Correct prob</p> <p>Correct decision</p> <p>Correct reason</p>
TOTAL		20 SCORES	
5 (a) (i)		<p>A_1</p> <p>A_1</p> <p>A_1</p> <p>A_1</p> <p>A_1</p> <p>A_1</p>	<p>For side</p> <p>For side</p> <p>For side</p> <p>For side</p> <p>For base</p> <p>For top</p>
(ii)	$2(LW + LH + WH) = 422.8$ $(12.4 \times 5.55 + 12.4H + 5.5H) = 211.4$ $\frac{17.9H}{17.9} = \frac{143.2}{17.9}$ $H = 8cm$	<p>A_1</p> <p>M_1</p> <p>M_1</p> <p>M_1</p>	<p>Substitution</p> <p>$H = 8$</p>
(iii)	$\text{Volume} = 12.4 \times 5.5 \times 8$ $= 545.6cm^3$	<p>A_1</p> <p>M_1</p>	<p>Substitution</p> <p>545.6</p>

(b)	<p>1 box = 950</p> <p>500 boxes = 950×500</p> <p style="text-align: center;">$= \text{Shs. } 475,000$</p> $A = 475,000 \left(1 + \frac{80}{100}\right)^2$ $= 475,000(1.8)^2$ $= \text{Shs. } 1,539,000$ <p>Decision: Umaru will not achieve his target</p> <p>Reason: Because the money he will get after selling the cow is less than his target amount</p>	<p>M_1</p> <p>M_1</p> <p>M_1</p> <p>M_1</p> <p>M_1</p> <p>M_1</p> <p>A_1</p> <p>A_1</p>	<p>Correct decision</p> <p>Correct reason</p>
TOTAL		20 SCORES	
<p>6</p> <p>(a)</p> <p>(i)</p>	 <p>Subject Name Item 5/18 Paper code</p> <p>Sketch</p> <p>Main road</p> <p>Officer</p> <p>Home</p> <p>Accurate diagram</p> <p>Main road</p> <p>Officer</p> <p>Home</p> <p>Gom</p> <p>My home is 300m East of organization officer</p> <p>(ii) Time = $\frac{300}{20}$</p> <p style="text-align: center;">$= 15 \text{ minutes}$</p> <p>We will take time 15 minutes</p> <p>1cm = 60m</p> <p>Officer - Main road = $\frac{425}{20}$</p> <p style="text-align: center;">$= 8.5 \text{ cm}$</p> <p>Main road - Officer = $\frac{300}{20}$</p> <p style="text-align: center;">$= 6 \text{ cm}$</p> <p>A_1 for 45°</p> <p>A_1 for 8.5cm</p> <p>A_1 for 180°</p> <p>A_1 for 6cm</p> <p>A_1 for 300m</p> <p>A_1 for 45° or 90° or N 90° E</p>	<p>A_1</p> <p>A_1</p> <p>A_1</p> <p>A_1</p>	<p>For 45°</p> <p>For 8.5cm</p> <p>For 180°</p> <p>For 6cm</p>

(ii)	Description My home is 300m East of organization offices	A_1	For 300m
		A_1	For East or 90° or $N90^\circ E$
	Time = $\frac{300}{20}$ = 15 minutes	A_1	Substitution
	It will take 15 minutes	A_1	For 15
(b)	Let the taxable income be P		
(i)	$100,000 \times \frac{5}{100} = 5,000$	A_1	
	$100,000 \times \frac{15}{100} = 15,000$	A_1	
	$(P - 300,000) \times \frac{20}{100} = 0.2P - 60,000$		
	Total income tax = $0.2P - 40,000$ $\Rightarrow 0.2P - 40,000 = 26,900$	A_1	
	$\frac{0.2P}{0.2} = \frac{66900}{0.2}$ $P = 334,500$	M_1	
	Allowances		
	Transport $3000 \times 30 = 90,000$	M_1	
	Medical $= 40,000$		
	Insurance $\frac{300,000}{12} = 25,000$	M_1	
	Water & electricity $= 75,000$		
	Housing $= 90,000$		
	Total allowances $= 320,000$	M_1	
	Gross monthly income $= 334,500 + 320,000$ $= \text{Shs. } 654,500$	M_1	
	Number of employees $= \frac{10,000,000}{654,500}$ $= 15.2788$	M_1	
	\therefore The organization will recruit 15 employees	A_1	
(ii)	Percentage $= \frac{26900}{654,500} \times 100$ $= 4.1\%$	M_1 M_1	
TOTAL		20 SCORES	

END

