Task 1 P1 Tyronne Helsdon

(i) M1 $40 = 0.25M + 0.5E$ ✓
M2 $40 = 0.40M + 0.2E$ ✓

M = Mechanical Product

E = Electronic product

$\Rightarrow$ M1 $80 = 0.5M + E$
M2 $200 = 2M + E$

$\Rightarrow \quad 120 = 1.5M + 0$

$\Rightarrow M = \frac{120}{1.5} = \boxed{80}$ Mechanical components

$40 = 0.25(80) + 0.5E$

$\Rightarrow 40 = 20 + 0.5E$

$\Rightarrow 40 - 20 = 0.5E$

$\Rightarrow 20 = 0.5E$

$\Rightarrow E = \frac{20}{0.5} = \boxed{40}$ Electrical components

$40 = 0.25(80) + 0.5(40)$

$\Rightarrow 0.25(80) + 0.5(40) - 40 = 0$

$\Rightarrow 20 + 20 - 40 = 0$

P.T.O

Tyronne H

Task 1

$M1 = 40 = 0.25M + 0.5E$

$\Rightarrow 40 - 0.25M = 0.5E$

$\Rightarrow E = \frac{0.25}{0.5}M - \frac{40}{0.5}$ $\Rightarrow E = 0.5M - 80$

Electrical intercept

$M1 \Rightarrow 40 - 0.5E = 0.25M$

$\Rightarrow M = \frac{0.5}{0.25}E - \frac{40}{0.25}$ $\Rightarrow M = 2E - 160$

Mechanical intercept

$M2 = 40 = 0.4M + 0.2E$

$\Rightarrow 40 - 0.4M = 0.2E$

$\Rightarrow E = \frac{0.4}{0.2}M - \frac{40}{0.2}$ $\Rightarrow E = 2M - 200$

Electrical intercept

$M2 \Rightarrow 40 - 0.2E = 0.4M$

$\Rightarrow M = \frac{0.2}{0.4}E - \frac{40}{0.4}$ $\Rightarrow M = 0.5E - 100$

Mechanical intercept

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Task 1P1(ii)

Table 1 $0.25x + 0.50y = 40$ (Machine 1)

$0.25x = -0.50y + 40$

$x = \frac{-0.5}{0.25}(y) + \frac{40}{0.25}$

$x = -2(y) + 160$

y(E)	0	10	20	30	40	50	60	70	80
x(M)	160	140	120	100	80	60	40	20	0

Table 2 $0.4x + 0.20y = 40$ (Machine 2)

$0.4x = -0.20y + 40$

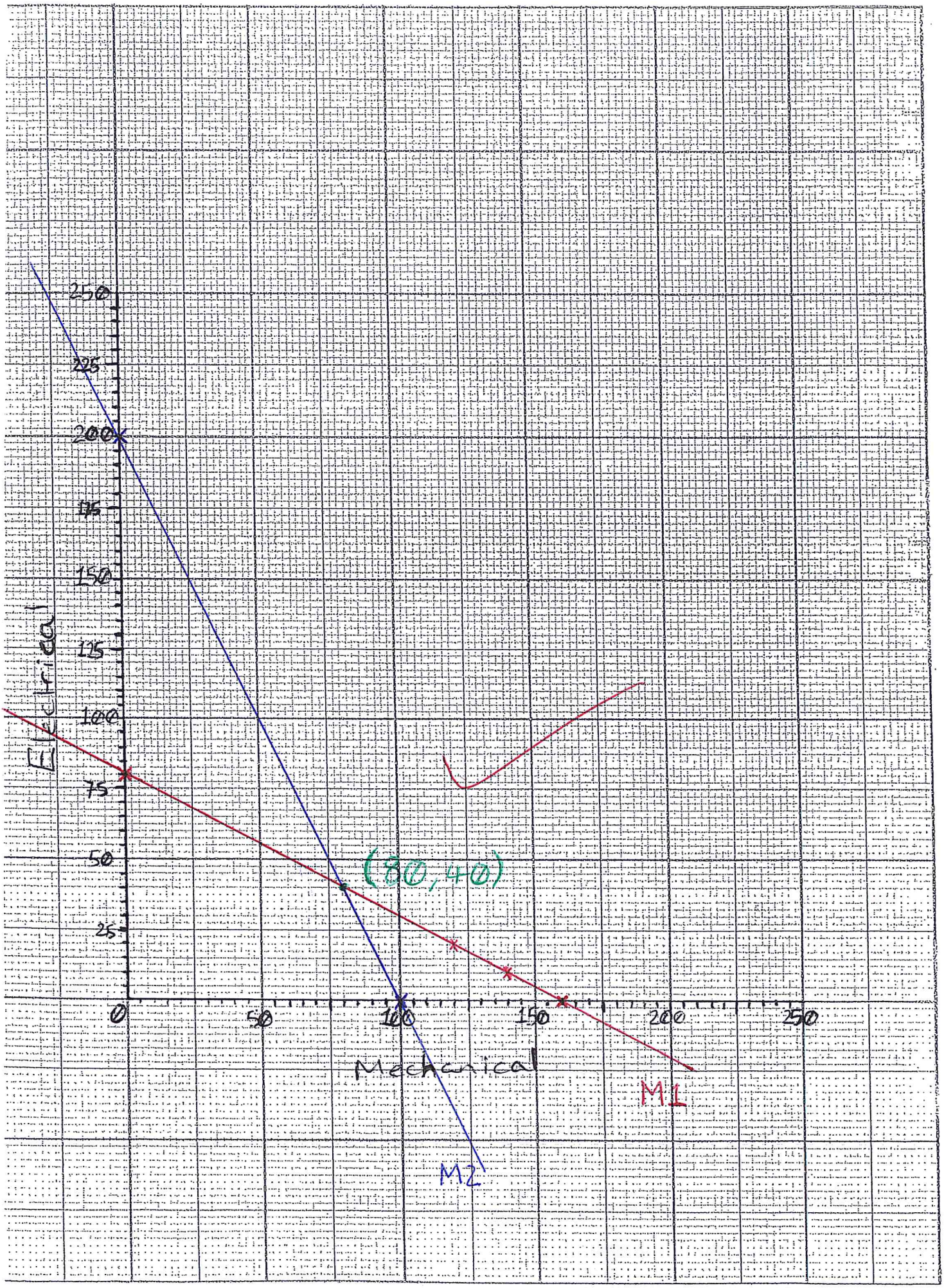
$x = \frac{-0.20}{0.40}y + \frac{40}{0.40}$

$x = -0.5(y) + 100$

y(E)	0	10	20	30	40	50	60	70	80
x(M)	100	95	90	85	80	75	70	65	60

100	120	140	160	180	200
50	40	30	20	10	0

(ii) Task 1 P1 Tyronne H



Tyronne H.

Task 1 M1

Voltage V volts	2.88	2.05	1.60	1.22	0.96
log V	0.459	0.312	0.204	0.086	-0.018
Admittance Y siemens	0.52	0.73	0.94	1.23	1.57
log Y	-0.284	-0.137	-0.027	0.090	0.196

$V = KY^n$ $(V, Y) = (2.88, 0.52), (1.22, 1.23)$

$2.88 = K(0.52)^n$ equation 1

$1.22 = K(1.23)^n$ equation 2

$$\frac{2.88}{1.22} = \frac{K(0.52)^n}{K(1.23)^n} \rightarrow 2.361 = \left(\frac{0.52}{1.23}\right)^n$$

$2.361 = 0.423^n \rightarrow \log 2.361 = \log 0.423^n$

$\rightarrow 0.373 = n(-0.374) \rightarrow \boxed{n = -0.997 \text{ or } -1}$

$V = KY^n \rightarrow \log(V) = \log(KY^n) \rightarrow \log V = \log K + \log Y^n$

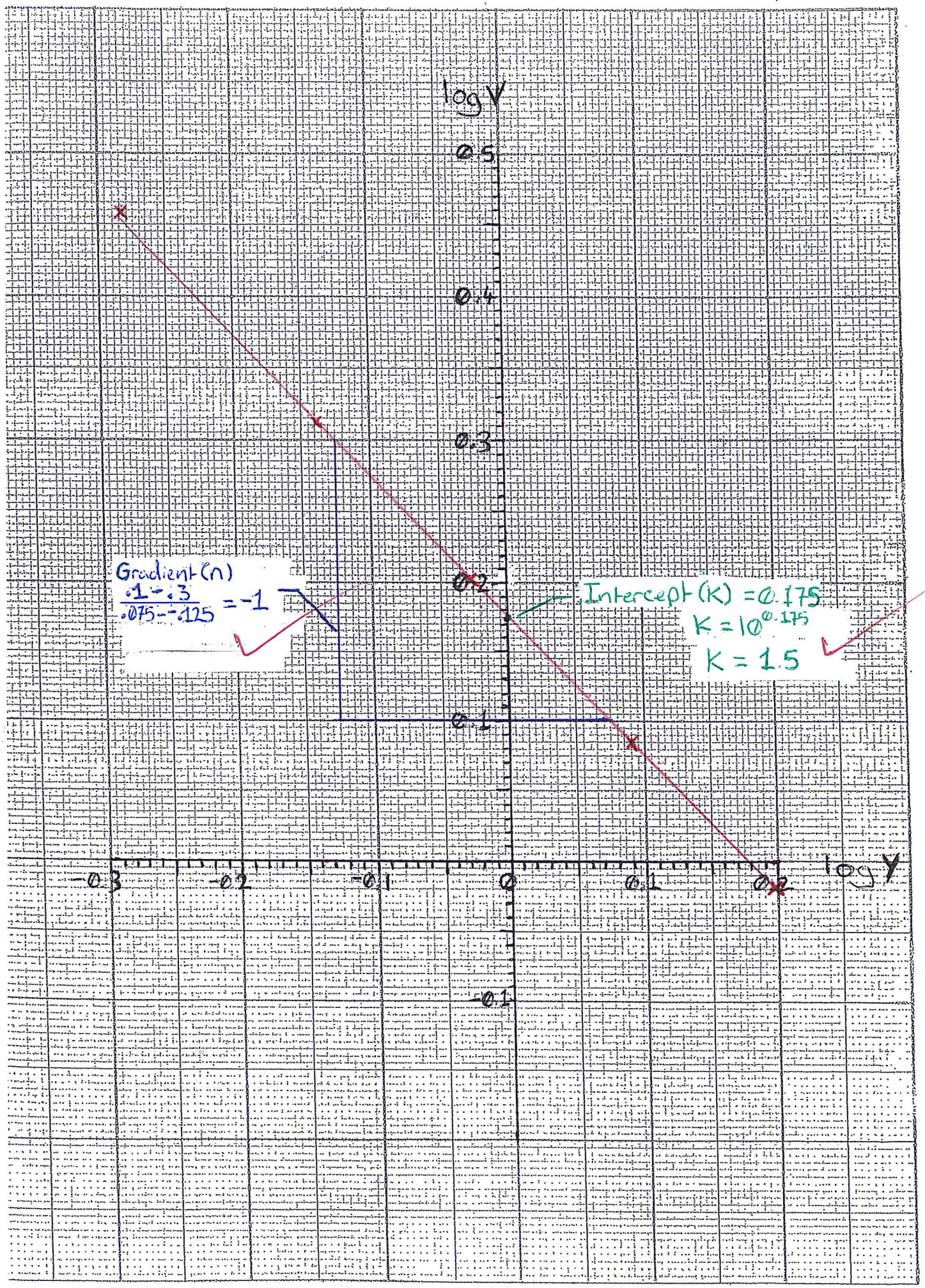
$\rightarrow \log V = \log K + n \log Y \rightarrow \boxed{\log V = n \log Y + \log K}$ equation 3

$(\log V, \log Y) = (0.459, -0.284) \rightarrow 0.459 = -1(-0.284) + \log K \rightarrow$

$\log K = 0.459 - 0.284 \Rightarrow \log K = 0.175 \rightarrow K = 10^{0.175}$

$\rightarrow \boxed{K = 1.496 \text{ or } 1.5}$

Task 1 (a) M1 $\log V = n\log Y + \log K$ Tyronne. H



Task 1 (b) M1

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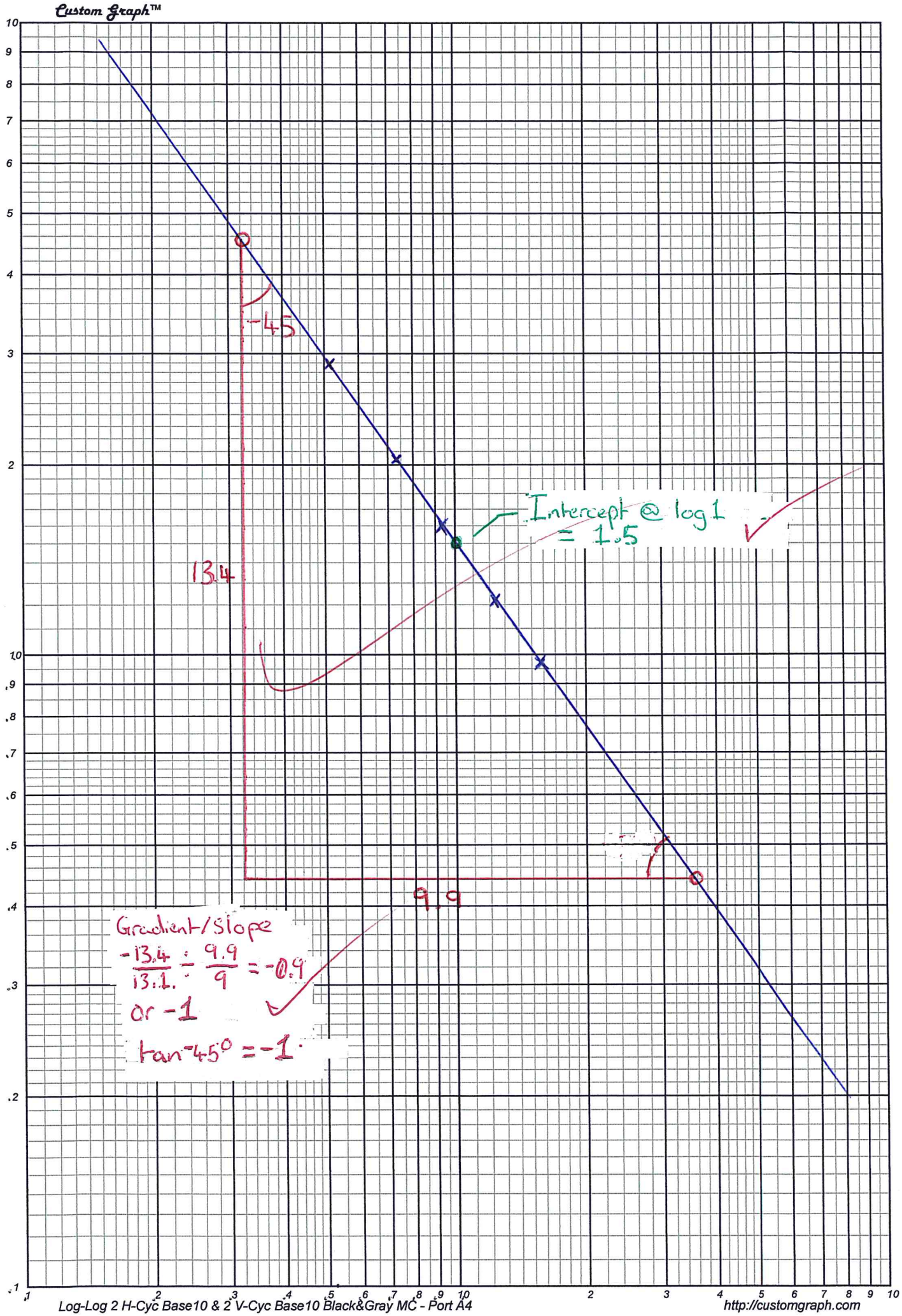

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Task 1 M1 (c)

a) By converting the table to it's logarithmic values, I was then able to construct a graph using linear graph paper. Considering the equation was in the form of $\log V = n\log Y + \log k$, the dependent variable was $\log V$ which I placed onto the y axis with $\log Y$ (the independent variable) on the x axis.

After plotting the points and marking the line on the paper I was able to confirm that the intercept was 0.175 by using antilog I arrived at my value for k of 1.5 which was obtained from the analytical method, I then found the gradient by choosing two points on the plot and calculated with $\frac{\Delta Y}{\Delta x}$ in this case $\frac{.1 - .3}{.075 - {}^{-}.125} = -1$, this was also in line with the results obtained analytically and confirmed that the law connecting the quantities is of the form $V = KY^n$

b) By using the values provided initially for the values of V and I was able to plot straight to a 2×2 cycle log-log graph, by using a scale of 0.0-1.0 for cycle 1 and 1-10 during the second, I could plot all of the points.

After plotting the points and determining the straight line I found 1 on the x axis, since log(1) is equal to zero this would be the y-intercept; therefore in accordance to the graph when $x = 1$, $y = 1.5$ this is what I was expecting to see and it was confirmed graphically. The gradient was found by measuring from two points seperated on the line and creating a right angled triangle; by measuring the lengths I calculated the gradient, I had to divide the vertical length by the length of the vertical cycle and the horizontal length by the length of the horizontal cycle, because the cycle lengths were different.

Hence $\frac{-13.4}{13.1} \div \frac{9.9}{9} = -0.9 = -1$

as a check the slope angle measured -45° approximately with a protractor and the tangent of this is -1, thus confirming the gradient.

with these results I confirmed the accuracy of the two graphs in relation to the law connecting the quantities

Tyronne H.

P2 (Task 2)

a) Given: Nth term = 80 $a = 30$ $d = 2$

$\Sigma = \frac{n}{2}(2a+(n-1)d)$ $\Sigma = \frac{80}{2}(2\cdot30+(80-1)\cdot2) \Rightarrow \Sigma = £872($

b) Given: $a = 100$ $8N = 1000$

$an = a+(n-1)d \Rightarrow 1000 = 100+(8-1)d \Rightarrow 900 = 7\cdot d$

$d = \frac{900}{7} = 128.57$

1 = 100 2 = 100 + 1 · 128.57 = 228.57 → 229
3 = 100 + 2 · 128.57 = 357.14 = 357
4 = 100 + 3 · 128.57 = 485.71 = 486
5 = 100 + 4 · 128.57 = 614.28 = 614
6 = 100 + 5 · 128.57 = 742.85 = 743
7 = 100 + 6 · 128.57 = 871.42 = 871
8 = 100 + 7 · 128.57 = 999.99 = 1000

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Task 3 P3

a) Given: 8^{th} term $= 1000$ $a = 100$ find: $r = ?$

$n^{th} = ar^{(n-1)} \rightarrow 1000 = 100r^{(8-1)} \rightarrow r^7 = \frac{1000}{100}$

$r = \sqrt[7]{10} \rightarrow r = 1.3895$

1^{st} term $= a =$ **100**

2^{nd} term $= 100(1.3895)^{2-1} = 138.95 =$ **139 rev/min**

3^{rd} term $= 100(1.3895)^{3-1} = 193.07 =$ **193 rev/min**

4^{th} term $= 100(1.3895)^{4-1} = 268.27 =$ **268 rev/min**

5^{th} term $= 100(1.3895)^{5-1} = 372.76 =$ **373 rev/min**

6^{th} term $= 100(1.3895)^{6-1} = 517.96 =$ **518 rev/min**

7^{th} term $= 100(1.3895)^{7-1} = 719.70 =$ **720 rev/min**

8^{th} term $= 100(1.3895)^{8-1} = 1000.02 =$ **1000 rev/min**

b) Given: Value $= £3000$ $r = 15\%$ annual decrease after each year, therefore $a - 15\% = 85\% a \rightarrow r = 0.85 . a = £2550$

Find: Value for 4^{th} year & n^{th} year value $< £550$

4^{th} year $= 2550\ (0.85)^{4-1} =$ **£1566**

$550 = 2550\ (0.85)^{n-1} \Rightarrow 0.85^{n-1} = \frac{550}{2550} \Rightarrow 0.85^{n-1} = 0.216$

$\Rightarrow \log(0.85)^{n-1} = \log(0.183) \Rightarrow n-1 \log(0.85) = \log(0.216)$

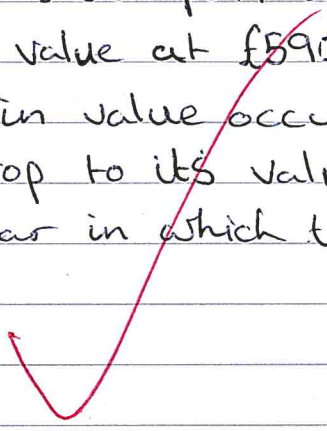
$n-1 = \frac{\log(0.216)}{\log(0.85)} \Rightarrow n-1 = 9.45 \Rightarrow n = 10.45$

10^{th} year $= 2550 \cdot (0.85)^{10-1} = £591$

11^{th} year $= 2550\ (0.85)^{11-1} =$ **£502**

P.T.O

Although the value of the lathe would technically drop below the £550 pound threshold part way through the 10th year, it started its value at £591, it is only when the next 15% reduction in value occurs; in the 11th year that it would drop to its value <£550 of £502, it's therefore the 11th year in which the lathe would be sold



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Task 4 P4 Given $Z_1 = 1+j2$, $Z_2 = 4-j3$, $Z_3 = -2+j3$, $Z_4 = -5-j$

A)

$1+j2 \Rightarrow z = r = \sqrt{(1)^2+(2)^2} = 2.236$ I quadrant

$\Rightarrow \arg z = \tan^{-1}\left(\frac{2}{1}\right) = 63.43^\circ \Rightarrow 1+j2 = 2.236 \angle 63.43^\circ$

$4-j3 \Rightarrow z = r = \sqrt{(4)^2+(3)^2} = 5$ IV quadrant

$\Rightarrow \arg z = \tan^{-1}\left(\frac{-3}{4}\right) = -36.87^\circ$

$\Rightarrow 4-j3 = 5 \angle -36.87^\circ$

$-2+j3 \Rightarrow z = r = \sqrt{(-2)^2+(3)^2} = 3.61$ II quadrant

$\Rightarrow \arg z = \tan^{-1}\left(\frac{3}{-2}\right) = 180^\circ - 56.31^\circ = 123.69^\circ$

$\Rightarrow -2+j3 = 3.61 \angle 123.69^\circ$

$-5-j \Rightarrow z = r = \sqrt{(-5)^2+(-1)^2} = 5.099$ III quadrant

$\Rightarrow \arg z = \tan^{-1}\left(\frac{-1}{-5}\right) = 11.310 - 180 = -168.69^\circ$

$\Rightarrow -5-j = 5.099 \angle -168.69^\circ$

a) $Z_1 Z_3 + Z_4 \Rightarrow (2.236 \angle 63.43^\circ)(3.61 \angle 123.69^\circ) + (5.099 \angle -168.69^\circ$

$Z_1 Z_3 \Rightarrow (2.236 * 3.61) \angle (63.43 + 123.69) = 8.07 \angle 187.39^\circ$

$x = r\cos\theta$ and $y = r\sin\theta$

$8.07 \angle 187.39^\circ$ ① $+ 5.099 \angle -168.69^\circ$ ② Can't add or subtract in polar

① $8.07 \angle 187.39^\circ \Rightarrow x = r\cos\theta \Rightarrow 8.07\cos(187.39) = -8$

$\Rightarrow y = r\sin\theta \Rightarrow 8.07\sin(187.39) = -1$

$\Rightarrow 8.07 \angle 187.39^\circ = -8-j$

P.T.O

② $5.099 \angle -168.69^\circ$ is given $Z4 = -5 - j$

$-8 - j + -5 - j \Rightarrow (-8 + -5) - (-j - j) = -13 - j2$

$-13 - j2 \Rightarrow Z = r = \sqrt{(-13)^2 + (-2)^2} = 13.153$

$\Rightarrow Z = \theta = \tan^{-1}\left(\frac{-2}{-13}\right) = 8.75$

$180 + 8.75 = 188.75^\circ$ or $-180 + 8.75 = -171.25^\circ$

$-13 - j2 \Rightarrow \boxed{13.153 \angle 188.75^\circ}$ or $\boxed{13.153 \angle -171.25^\circ}$

Tyronne. H

Task 4 P4

A) b) $\frac{Z_1 + Z_3}{Z_2 - Z_4} \Rightarrow \frac{(1+j2)+(-2+j3)}{(4-j3)-(-5-j)}$ ① ②

① $(1+j2)+(-2+j3) \Rightarrow (1-2)+j(2+3) = -1+j5$ ③

② $(4-j3)-(-5-j) \Rightarrow (4-(-5))-j(-3-(-1)) = 9-j2$ ④

③ $-1+j5$ ④ $9-j2$

③ $-1+j5 \Rightarrow z = r = \sqrt{(-1)^2+(5)^2} = 5.099$

$\Rightarrow \arg z = \theta = \tan^{-1}\left(\frac{5}{1}\right) \Rightarrow 78.69^\circ \Rightarrow 180^\circ - 78.69^\circ = 101.31^\circ$

$\Rightarrow r\angle\theta \Rightarrow 5.099 \angle 101.31^\circ$

④ $9-j2 \Rightarrow z = r = \sqrt{(9)^2+(-2)^2} = 9.220$

$\Rightarrow \arg z = \theta = \tan^{-1}\left(\frac{-2}{9}\right) \Rightarrow -12.529$

$\Rightarrow r\angle\theta \Rightarrow 9.849 \angle -12.529^\circ$

$\frac{5.099 \angle 101.31^\circ}{9.220 \angle -12.529^\circ} \quad \frac{5.099}{9.220} \angle (101.31 - (-12.529)) = \boxed{0.553 \angle 113.839^\circ}$

$.553\cos(113.839) + j.553\sin(113.83$

$-0.2235 + j\,0.506$

Tyronne. H

Task 4 P4 B)

a) $3\angle 20° \cdot 15\angle 45° \Rightarrow (3 \cdot 15)\angle(20+45) = 45\angle 65°$

$45\angle 65° \Rightarrow x = r\cos\theta \Rightarrow 45\cos(65) = 19.018$

$y = r\sin\theta \Rightarrow 45\sin(65) = 40.784$

$45\angle 65° \Rightarrow \boxed{19.018 + j40.784}$

or

① $3\angle 20° \cdot$ ② $15\angle 45°$

① $3\angle 20° \Rightarrow x = r\cos\theta \Rightarrow 3\cos(20) = 2.819$

$y = r\sin\theta \Rightarrow 3\sin(20) = 1.026$

$3\angle 20° \Rightarrow 2.819 + j1.026$

② $15\angle 45° \Rightarrow x = r\cos\theta \Rightarrow 15\cos(45) = 10.607$

$y = r\sin\theta \Rightarrow 15\sin(45) = 10.607$

$15\angle 45° \Rightarrow 10.607 + j10.607$

$(2.819 + j1.026)(10.607 + j10.607) \Rightarrow 2.819(10.607 + j10.607) + j1.026(10.607 + j10.6$

$\Rightarrow ((2.819 \cdot 10.607) + (j10.607 \cdot 2.819)) + ((j1.026 \cdot 10.607) + (j^2 \cdot (1.026 \cdot 10.607))$

$\Rightarrow 29.901 + j29.901 + j10.883 + ((-1) \cdot 10.883)$

$\Rightarrow (29.901 - 10.883) + j(29.901 + 10.883)$

$= \boxed{19.018 + j40.784}$ or $45\angle 65°$

Tyronne. H

Task 4 P4 B)

b) ① $2.4\angle 65° \times$ ② $4.4\angle -21°$

① $2.4\angle 65° \Rightarrow x = r\cos\theta \Rightarrow 2.4\cos(65) = 1.014$

$y = r\sin\theta \Rightarrow 2.4\cos(65) = 2.175$

$2.4\angle 65° = 1.014 + j2.175$

② $4.4\angle -21° \Rightarrow x = r\cos\theta \Rightarrow 4.4\cos(-21) = 4.108$

$y = r\sin\theta \Rightarrow 4.4\sin(-21) = -1.577$

$4.4\angle -21° = 4.108 - j1.577$

$(1.014 + j2.175)(4.108 - j1.577) \Rightarrow 1.014(4.108 - j1.577) + j2.175(4.108 - j1.577)$

$\Rightarrow ((1.014 * 4.108) + (-j1.577 * 1.014)) + ((j2.175 * 4.108) + (j^2 * (2.175 * 1.577))$

$\Rightarrow 4.166 - j1.599 + j8.935 + ((-1) * 3.430)$

$\Rightarrow (4.166 + 3.43) + j(-1.599 + 8.935)$

$\Rightarrow \boxed{7.596 + j7.336}$

$2.4\angle 65° \times 4.4\angle -21°$

$\Rightarrow (2.4 * 4.4)\angle(65 + (-21)) = 10.56\angle 44°$

$x = r\cos\theta = 10.56\cos(44) = 7.596$

$y = r\sin\theta = 10.56\sin(44) = 7.336$

$10.56\angle 44° \Rightarrow \boxed{7.596 + j7.336}$

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Task 4 P4 B)

C) ① $5\angle 30^\circ \times$ ② $4\angle 80^\circ \div$ ③ $10\angle -40^\circ$

① $5\angle 30^\circ \Rightarrow x = r\cos\theta \Rightarrow 5\cos(30) = 4.33$

$y = r\sin\theta \Rightarrow 5\sin(30) = 2.5$

$5\angle 30^\circ \Rightarrow 4.33 + j2.5$

② $4\angle 80^\circ \Rightarrow x = r\cos\theta \Rightarrow 4\cos(80) = 0.695$

$y = r\sin\theta \Rightarrow 4\sin(80) = 3.939$

$4\angle 80^\circ \Rightarrow 0.695 + j3.939$

③ $10\angle -40 \Rightarrow x = r\cos\theta \Rightarrow 10\cos(-40) = 7.66$

$y = r\sin\theta \Rightarrow 10\sin(-40) = -6.428$

$10\angle -40 \Rightarrow 7.66 - j6.428$

④ $(4.33 + j2.5)(0.695 + j3.939) / (7.66 - j6.428)$

④ $(4.33 + j2.5)(0.695 + j3.939) \Rightarrow 4.33(0.695 + j3.939) + j2.5(0.695 + j3.939)$

$\Rightarrow ((4.33 * 0.695) + (j3.939 * 4.33)) + ((j2.5 * 0.695) + (j^2(2.5 * 3.939))$

$\Rightarrow 3.009 + j17.056 + j1.738 + ((-1) * 9.848)$

$\Rightarrow (3.009 - 9.848) + j(17.056 + 1.738)$

$\Rightarrow -6.839 + j18.794$

P.T.O

$$\frac{-6.839 + j18.794}{7.66 - j6.428} \Rightarrow \frac{-6.839 + j18.794}{7.66 - j6.428} \times \frac{7.66 + j6.428}{7.66 + j6.428}$$

$$\Rightarrow \frac{-6.839(7.66 + j6.428) + j18.794(7.66 + j6.428)}{(7.66 - j6.428)(7.66 + j6.428)}$$

$$\Rightarrow \frac{((-6.839 * 7.66) + (j6.428 * -6.839)) + ((j18.794 * 7.66) + (j^2(18.794 * 6.428))}{(7.66)^2 - (j6.428)^2}$$

$$\Rightarrow \frac{-52.387 - j43.961 + j143.962 + ((-1) * 120.808)}{58.676 - j^2 41.319}$$

$$\Rightarrow \frac{(-52.387 - 120.808) + j(-43.961 + 143.962)}{58.676 - (-1) * 41.319}$$

$$\Rightarrow \frac{-173.195 + j100.001}{99.995} \Rightarrow \frac{-173.195}{99.995} + j\frac{100.001}{99.995}$$

$$\Rightarrow \boxed{-1.732 + j}$$

$5\angle 30^\circ \times 4\angle 80^\circ \div 10\angle -40^\circ \Rightarrow (5\angle 30^\circ)(4\angle 80^\circ) \Rightarrow (5*4)\angle(30+80$

$\Rightarrow 20\angle 110^\circ \Rightarrow (20\angle 110^\circ)/10\angle -40^\circ \Rightarrow (\frac{20}{10})\angle 110-(-40)$

$= 2\angle 150^\circ \quad x = r\cos\theta \Rightarrow 2\cos(150) = -1.732$

$y = r\sin\theta \Rightarrow 2\sin(150) = 1$

$2\angle 150^\circ \Rightarrow \boxed{-1.732 + j}$

Tyronne. H

Task 4 M2

a) Given :- $Z1 = (3+j6)\Omega$, $Z2 = (4-j3)\Omega$

$$Y = \frac{1}{Z1} + \frac{1}{Z2} \Rightarrow \textcircled{1}\frac{1}{3+j6} + \textcircled{2}\frac{1}{4-j3}$$

$$\textcircled{1}\ \frac{1}{3+j6} \Rightarrow \frac{1}{3+j6} \times \frac{3-j6}{3-j6} \Rightarrow \frac{3-j6}{(3)^2+(6)^2} = \frac{3}{45} - j\frac{6}{45} = 0.06 - j0.13$$

$$\textcircled{2}\ \frac{1}{4-j3} \Rightarrow \frac{1}{4-j3} \times \frac{4+j3}{4+j3} \Rightarrow \frac{4+j3}{(4)^2+(3)^2} = \frac{4}{25} + j\frac{3}{25} = 0.16 + j0.12$$

$$\frac{1}{3+j6} + \frac{1}{4-j3} \Rightarrow 0.06 - j0.13 + 0.16 + j0.12$$

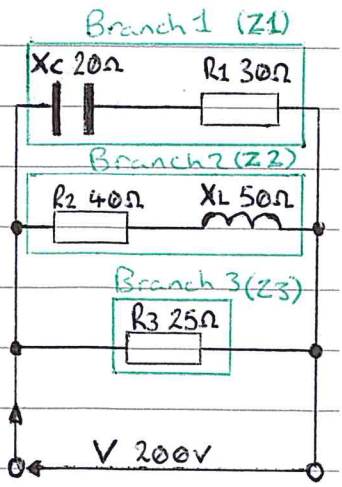
$$\Rightarrow (0.06+0.16)\ j(-0.13+0.12) = 0.22 - j0.01$$

$$Y = 0.22 - j0.01 \Rightarrow 0.22\angle -2.603$$

$$I = \frac{V}{Z} = VY = (120\angle 0^\circ)(0.22\angle -2.603)$$
$$= (120 \cdot 0.22)\ (0^\circ - 2.603^\circ)$$
$$= 26.4\angle -2.603^\circ$$

The magnitude of current is equal to 26.4A
it lags the voltage by 2.603°

Task 4 M2



b) Given ① Branch 1; $X_C = 20\Omega$ $R_1 = 30\Omega$
② Branch 2; $R_2 = 40\Omega$ $X_L = 50\Omega$
③ Branch 3; $R_3 = 25\Omega$

$$Y = \frac{1}{Z_1} + \frac{1}{Z_2} + \frac{1}{Z_3}$$

① $Z_1 = R - jx_C \Rightarrow 30 - j20$

② $Z_2 = R + jx_L \Rightarrow 40 + j50$

③ $Z_3 = 25\Omega$

$$Y_1 = \frac{1}{Z_1} \Rightarrow \frac{1}{30-j20} \Rightarrow \frac{1}{30-j20} \times \frac{30+j20}{30+j20} \Rightarrow \frac{30+j20}{(30)^2+(20)^2}$$

$$\Rightarrow \frac{30}{1300} + j\frac{20}{1300} = 0.023 + j0.015 \text{ Siemans}$$

$$Y_2 = \frac{1}{Z_2} \Rightarrow \frac{1}{40+j50} \Rightarrow \frac{1}{40+j50} \times \frac{40-j50}{40-j50} \Rightarrow \frac{40-j50}{(40)^2+(-50)^2}$$

$$\Rightarrow \frac{40}{4100} - j\frac{50}{4100} = 0.010 - j0.012 \text{ Siemans}$$

$$Y_3 = \frac{1}{Z_3} \Rightarrow \frac{1}{25} = 0.04 \text{ Siemans}$$

$$Y = \frac{1}{Z_1} + \frac{1}{Z_2} + \frac{1}{Z_3} \Rightarrow (0.023 + j0.015) + (0.01 - j0.012) + (0.04)$$

$$\Rightarrow (0.023 + 0.01 + 0.04)\ j(0.015 - 0.012) = 0.073 + j0.003$$

$$\Rightarrow Z = r = \sqrt{(0.073)^2 + (0.003)^2} = 0.073$$

$$\arg Z = \tan^{-1}\left(\frac{0.003}{0.073}\right) = 2.353^\circ \Rightarrow 0.073 \angle 2.353^\circ$$

P.T.O

$$I = \frac{V}{Z} = VY \Rightarrow (200\angle 0^\circ)(0.073\angle 2.353^\circ)$$
$$\Rightarrow (200 * 0.073)(0^\circ + 2.353^\circ)$$
$$\Rightarrow 14.6\angle 2.353^\circ$$

$14.6\angle 2.353^\circ \Rightarrow x = r\cos\theta \Rightarrow 14.6\cos(2.353) = 14.588$

$\Rightarrow y = r\sin\theta \Rightarrow 14.6\sin(2.353) = 0.599$

$14.6\angle 2.353^\circ = \boxed{14.588 + j0.599}$

The magnitude of current is 14.588A and it leads the voltage by 2.353°