

This section details the assessment criteria. The *extent* to which these are demonstrated by you determines your mark. The marks available for each criterion are shown. Lecturers will use the space provided to comment on the achievement of the task(s), including those areas in which you have performed well and areas that would benefit from development/improvement.

Common Assessment Criteria Applied	Marks available	Marks awarded
1. Research-informed Literature Extent of research and/or own reading, selection of credible sources, application of appropriate referencing conventions.		
2. Knowledge and Understanding of Subject Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.		
Excellent knowledge and understanding of the main concepts and key theories. All aspects have been covered in excellent detail	40	34
3. Analysis Analysis, evaluation and synthesis; logic, argument and judgement; analytical reflection; organisation of ideas and evidence		
Your work shows evidence of some logical, analytical thinking and synthesis. Your work also shows that, you can analyse new and abstract data and situations without guidance.	20	13
4. Practical Application and Deployment Deployment of methods, materials, tools and techniques; application of concepts; formulation of innovative and creative solutions to solve problems.		
A good application of a range of methods, materials, tools and techniques.	40	24
5. Skills for Professional Practice Attributes in professional practice: Individual and collaborative working; deployment of appropriate media; presentation and organisation.		
		71 %

Assignment Mark Overall (Assessment marks are subject to ratification at the Exam Board. These comments and marks are to give feedback on module work and are for guidance only until they are confirmed.)	Late Submission Penalties (tick if appropriate)	
	Up to one-week late	
	Over one week late	

NATHAN MILLER

ELECTRICAL + ELECTRONIC
PRINCIPALS

HND YEAR 2 (PART TIME)

71%

ELEC PRINCIPLES ASSIGNMENT

NATHAN MILLER

TASK 1

a.) V_{TH} is the voltage between A-B $\therefore$ across Z_3

$$\left(\frac{0-4j}{9+0j+0+3j+0-4j} \right) \times 60+0j$$

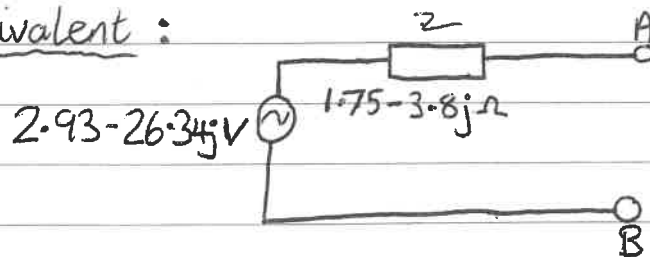
$$= \frac{(0-4j)(60+0j)}{9-j} = \frac{0-240j}{9-j} \therefore \frac{0-240j}{9-j} \times \frac{9+j}{9+j}$$

$$V_{TH} = \frac{-2160j-240j^2}{82} = \frac{240-2160j}{82} = \boxed{2.93-26.34jV} \quad \checkmark (10)$$

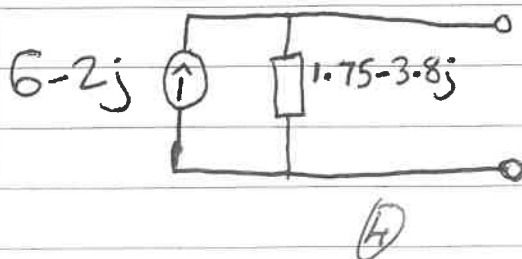
Z_{TH} = Deactivate V_{source} , $(Z_1+Z_2)//Z_3$

$$Z_{TH} = \frac{(9+3j)(0-4j)}{(9+3j+0-4j)} = \frac{12-36j}{9-j} = \boxed{1.75-3.8j\Omega} \quad \checkmark (10)$$

Thevenin Equivalent:



Norton Equivalent:



show calculation.

$$Z_N = Z_{TH} = 1.75-3.8j\Omega$$

$$I_N = \frac{V_{TH}}{Z_{TH}}$$

$$\therefore I_N = 6-2jA \quad \checkmark (10)$$

ELEC PRINCIPLES ASSIGNMENT

NATHAN MILLER

Task 1

$$b) I_{Z4} : Z_{TOTAL} = 1.75 - 3.8j + 5 - 5j = 6.75 - 8.8j$$

$$I_{Z4} = \frac{V_{TH}}{Z_{TH} + Z_4} = \frac{2.93 - 26.34j}{6.75 - 8.8j} \times \frac{6.75 + 8.8j}{6.75 + 8.8j}$$

$$= \frac{251.6 - 152j}{123} = 2.045 - 1.236jA \text{ Convert to polar} = 2.39 \angle -31.1^\circ$$

$$\text{Power} = 2.39^2 \times 5 = 28.561W \quad \checkmark$$

(5)

$$I_{Z5} : Z_{TOTAL} = 11.75 - 3.8j$$

$$\frac{V_{TH}}{Z_{TH} + Z_5} = \frac{2.93 - 26.34j}{11.75 - 3.8j} \times \frac{11.75 + 3.8j}{11.75 + 3.8j}$$

$$= \frac{134.53 - 298.37j}{152.5} = 0.88 - 1.96jA$$

$$\text{Convert to polar} = 2.15 \angle 65.82^\circ$$

$$\text{Power} = 2.15^2 \times 10 = 46.2W$$

(4)

ELEC PRINCIPLES ASSIGNMENT

NATHAN MILLER

Task 1

$$c) I_{Z4} = \frac{Z_{TH}}{Z_{TOTAL}} \times I_N = \frac{(1.75 - 3.8j)}{6.75 - 8.8j} \times 6 - 2j$$

$$= 2.045 - 1.236jA \quad \text{convert to polar} = 2.39 \angle -31.1^\circ$$

$$\text{Power} = 2.39^2 \times 5 = 28.561W \quad \checkmark \quad (2)$$

$$I_{Z5} = \frac{Z_{TH}}{Z_{TOTAL}} \times I_N = \frac{(1.75 - 3.8j)}{11.75 - 3.8j} \times 6 - 2j$$

$$= 0.88 - 1.96jA \quad \text{convert to polar} = 2.15 \angle 65.8^\circ$$

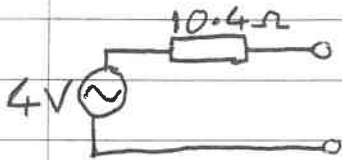
$$\text{Power} = 2.15^2 \times 10 = 46.2W \quad (2)$$

ELECTRICAL PRINCIPLES ASSIGNMENT

NATHAN MILLER

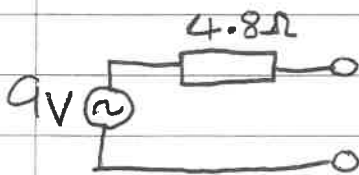
Task 2

Circuit A Thevenin: $V_{TH} = \frac{4}{4+6} \times 10 = 4V \checkmark$ (4)



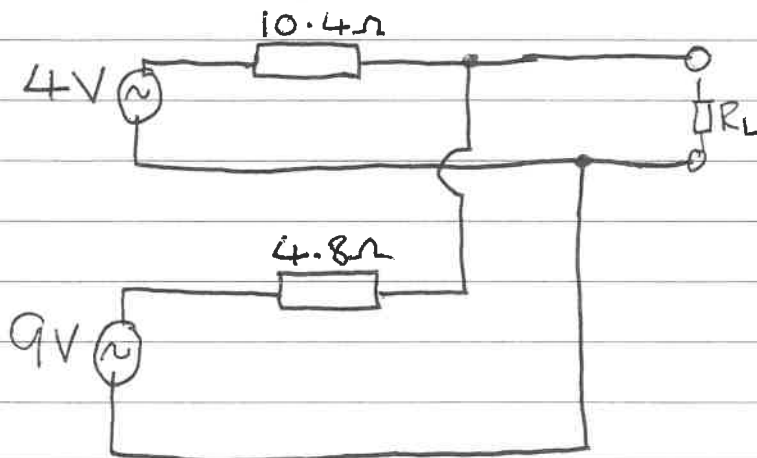
$R_{TH} = \left(\frac{6 \times 4}{6+4} \right) + 8 = 10.4 \Omega \checkmark$ (4)

Circuit B Thevenin: $V_{TH} = \frac{12}{12+8} \times 15 = 9V \checkmark$ (4)

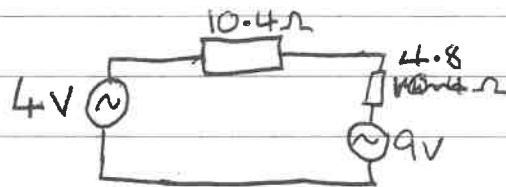


$R_{TH} = \frac{12 \times 8}{12+8} = 4.8 \Omega \checkmark$ (4)

Connect in parallel =



Redraw:



$Z_{TH} = \frac{10.4 \times 4.8}{10.4 + 4.8} = 3.28 \Omega$

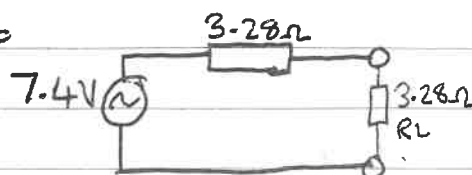
For max power transfer

$R_L = Z_{TH} \therefore 3.28 \Omega$

$V_{TH} = \frac{V_1 - V_2}{R_1 + R_2} = 0.33A$

$\therefore V_{TH} = 9 - (4.8 \times 0.33) = 7.4V \checkmark$ (4)
OR: $V_{TH} = 4 + (10.4 \times 0.33) = 7.4V$

Combined Circuit =
Thevenin



$7.4V / 6.56 = 1.13A$ (4)

$1.13^2 \times 6.56 = 8.38W$

Power to $R_L \therefore 4.19W$