

MARKING CRITERIA AND STUDENT FEEDBACK

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.		10	
References limited but present			4
2. Knowledge and Understanding of Subject Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.		20	
Knowledge is accurate with good understanding.			11
3. Analysis Analysis, evaluation and synthesis; logic, argument and judgement; analytical reflection; organisation of ideas and evidence		20	
Evidence of some logical and analysed things.			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.		40	
Could not work independently. But a good appropriate application of standard methods. You needed help and asked for assistance of your classmates.			25
5. Skills for Professional Practice Attributes in professional practice: individual and collaborative working; deployment of appropriate media; presentation and organisation.		10	
Room for improvement			4

Assignment Mark (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 (capped at 40%)

First Attempt?

57 %

FdSc & HN COMMON ASSESSMENT AND MARKING CRITERIA

	OUTRIGHT FAIL	UNSATISFACTORY	SATISFACTORY	GOOD	VERY GOOD	EXCELLENT	EXCEPTIONAL
Assessment Criteria	REFER (equivalent to 0-29%)	REFER (equivalent to 30-39%)	PASS (equivalent to 40-49%)	PASS (equivalent to 50-59%)	MERIT (equivalent to 60-69%)	DISTINCTION (equivalent to 70-79%)	DISTINCTION (equivalent to 80-100%)
1. Research-informed Literature Extent of research and/or own reading, selection of credible sources, application of appropriate referencing conventions	Little or no evidence of reading. Views and findings unsupported and non-authoritative. Referencing conventions largely ignored.	Poor evidence of reading and/or of reliance on inappropriate sources, and/or indiscriminate use of sources. Referencing conventions used inconsistently.	References to a limited range of mostly relevant sources. Some omissions and minor errors. Referencing conventions evident though not always applied consistently.	Inclusion of a range of research-informed literature, including sources retrieved independently. Referencing conventions mostly consistently applied.	Inclusion of a wide range of research-informed literature, including sources retrieved independently. Selection of relevant and credible sources. Very good use of referencing conventions, consistently applied.	A comprehensive range of research informed literature embedded in the work. Excellent selection of relevant and credible sources. High-level referencing skills, consistently applied.	Outstanding knowledge of research-informed literature embedded in the work. Outstanding selection of relevant and credible sources. High-level referencing skills consistently and professionally applied.
2. Knowledge and Understanding of Subject Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.	Major gaps in knowledge and understanding of material at this level. Substantial inaccuracies.	Gaps in knowledge, with only superficial understanding. Some significant inaccuracies.	Evidence of basic knowledge and understanding of the relevant concepts and underlying principles.	Knowledge is accurate with a good understanding of the field of study.	Knowledge is extensive. Exhibits understanding of the breadth and depth of established views.	Excellent knowledge and understanding of the main concepts and key theories. Clear awareness of challenges to established views and the limitations of the knowledge base.	Highly detailed knowledge and understanding of the main theories/concepts, and a critical awareness of the ambiguities and limitations of knowledge.
3. Analysis Analysis, evaluation and synthesis; logic, argument and judgement; analytical reflection; organisation of ideas and evidence	Unsubstantiated generalisations, made without use of any credible evidence. Lack of logic, leading to unsupported/missing conclusions. Lack of any attempt to analyse, synthesise or evaluate.	Some evidence of analytical intellectual skills, but for the most part descriptive. Ideas/findings sometimes illogical and contradictory. Generalised statements made with scant evidence. Conclusions lack relevance.	Evidence of some logical, analytical thinking and some attempts to synthesise, albeit with some weaknesses. Some evidence to support findings/ views, but evidence not consistently interpreted. Some relevant conclusions and recommendations, where relevant	Evidence of some logical, analytical thinking and synthesis. Can analyse new and/or abstract data and situations without guidance. An emerging awareness of different stances and ability to use evidence to support the argument. Valid conclusions and recommendations, where relevant	Sound, logical, analytical thinking; synthesis and evaluation. Ability to devise and sustain persuasive arguments, and to review the reliability, validity & significance of evidence. Ability to communicate ideas and evidence accurately and convincingly. Sound, convincing conclusions / recommendations.	Thoroughly logical work, supported by evaluated evidence. High quality analysis, developed independently or through effective collaboration. Ability to investigate contradictory information and identify reasons for contradictions. Strong, persuasive, conclusions, justifiable recommendations.	Exceptional work; judiciously selected and evaluated evidence. Very high quality analysis, developed independently or through effective collaboration. Ability to investigate contradictory information and identify reasons for contradictions. Highly persuasive conclusions
4. Practical Application and Deployment Effective deployment of appropriate methods, materials, tools and techniques; extent of skill demonstrated in the application of concepts to a variety of processes and/or contexts; formulation of innovative and creative solutions to solve problems.	Limited or no use of methods, materials, tools and/or techniques. Little or no appreciation of the context of the application.	Rudimentary application of methods, materials, tools and/or techniques but without consideration and competence. Flawed appreciation of the context of the application.	An adequate awareness and mostly appropriate application of well-established methods, materials, tools and/or techniques. Basic appreciation of the context of the application.	A good and appropriate application of standard methods, materials, tools and/or techniques. Good appreciation of the context of the application, with some use of examples, where relevant.	A very good application of a range of methods, materials, tools and/or techniques. Very good consideration of the context of the application, with perceptive use of examples, where relevant. Evidence of some innovation and creativity.	An advanced application of a range of methods, materials, tools and/or techniques. The context of the application is well considered, with extensive use of relevant examples. Application and deployment extend beyond established conventions. Innovation and creativity evident throughout.	Outstanding levels of application and deployment skills. Assimilation and development of cutting edge processes and techniques.
5. Skills for Professional Practice Demonstrates attributes expected in professional practice including: individual initiative and collaborative working; deployment of appropriate media to communicate (including written and oral); clarity and effectiveness in presentation and organisation.	Communication media is inappropriate or misapplied. Little or no evidence of autonomy in the completion of tasks. Work is poorly structured and/or largely incoherent.	Media is poorly designed and/or not suitable for the audience. Poor independent or collaborative initiative. Work lacks structure, organisation, and/or coherence	Can communicate in a suitable format but with some room for improvement. Can work as part of a team, but with limited involvement in group activities. Work lacks coherence in places and could be better structured.	Can communicate effectively in a suitable format, but may have minor errors. Can work effectively as part of a team, with clear contribution to group activities. Mostly coherent work and is in a suitable structure.	Can communicate well, confidently and consistently in a suitable format. Can work very well as part of a team, with very good contribution to group activities. Work is coherent and fluent and is well structured and organised.	Can communicate professionally and, confidently in a suitable format. Can work professionally within a team, showing leadership skills as appropriate, managing conflict and meeting obligations. Work is coherent, very fluent and is presented professionally.	Can communicate with an exceptionally high level of professionalism. Can work exceptionally well and professionally within a team, showing advanced leadership skills. Work is exceptionally coherent, very fluent and is presented professionally.



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

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LEVEL/ LEFEL 4

SEMESTER 2

MODULE CODE/ COD Y MODIWL: PSDE4021
ELECTRICAL TECHNOLOGY

ASSESSMENT TYPE/ MATH O ASESU: ASSIGNMENT

ASSESSMENT/COMPONENT/ ASESIAID/CYDRAN: 2 OF 2

COMPONENT WEIGHTING/ PWYSAU'R CYDRAN: 25 %

WORD COUNT/ NIFER Y GEIRIAU: 1500 WORDS/O EIRIAU

MODULE TUTOR / TIWTOR Y MODIWL: Steve Roberts

SUBMISSION DETAILS/ MANYLION CYFLWYNO:

- Make sure that Your Name , Your Student P Number, Your Module Title, Assignment Title and Your Module Lecturer's Name are clearly shown on the front page of your assignment
- All assignments must be submitted electronically to Turnitin unless indicated by the module lecturer here:
- If a paper submission is required then it will be indicated here: you will then be required to submit the assignment parts in a suitable report folder- not in poly-pockets - to the library.
- For paper submissions this form (ALL PAGES) MUST be printed out, signed, attached to the front of your assignment and submitted to the library separately from your electronic assignment submission.
- Assignments will not be accepted without this form as it is a requirement that you sign the disclosure regarding the referencing convention.
- DO NOT put this form into Turnitin or it will match many similarities with other students' submissions.



School of Applied Computing ASSIGNMENT SPECIFICATION

Student name:	Ieuan Forrest	Student P number:	
Programme:	HND/HNC Electrical & Electronic Engineering, Instrumentation Engineering & Power Systems Engineering		
Lecturer:	Steve Roberts	Internal Verifier:	Jason Pointer
Assignment Title:	AC Circuit Lab		
Hand Out Date:	07/03/18	Submission deadline:	09/05/18

Referencing:	In the main body of your submission you must give credit to authors on whose research your work is based. Append to your submission a reference list that indicates the books, articles, etc. that you have read or quoted in order to complete this assignment (e.g. for books: surname of author and initials, year of publication, <u>title of book</u> , edition, publisher: place of publication).		
Disclosure:	I declare that this assignment is all my own work and that I have acknowledged all materials used from the published or unpublished works of other people. All references have been duly cited.		
Student's Signature:	Hardcopy assignments will not be accepted without a signature here	Date:	

Late submission will result in a late penalty mark, as follows:

Up to one week late, maximum mark of 40% for first attempts and 0% for resubmissions.
(Academic Quality Handbook 2017/18 7.5 (5))

**Learning Outcomes tested
(from module syllabus)**

1. Produce routine solutions to typical electrical problems.
2. Relate and apply basic electrical theory to collected data.

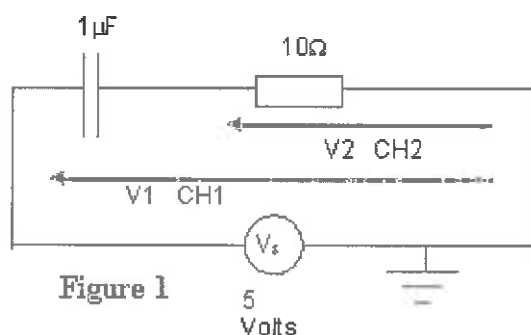
TASK DESCRIPTION

Introduction

An **alternating current (AC)** is an electrical current whose magnitude and direction vary cyclically, as opposed to direct current, whose direction remains constant. Usually the waveform of an AC power circuit is a sine wave, as this results in the most efficient transmission of energy. It is essential to have awareness of ac waveform and the values associated but also the relationship between the current and voltage values.

This assignment will introduce you into some of the different aspects of ac theory and along with practical work.

Task 1 - RC Circuits



- For each of the frequencies in the table below, calculate the value of impedance and hence the magnitude of the current flowing in the circuit of *figure 1*.
- Determine the value of the phase angle between the voltage and the current in the circuit.

Capacitive Circuit Calculations

Frequency (kHz)	$X_C (\Omega)$	Impedance (Ω)	Current (A)	Phase Angle ($^\circ$)
1	159.15	159.46	0.031	86.40
2	79.58	80.21	0.062	82.84
3	53.05	53.98	0.093	79.32
4	39.79	41.03	0.121	75.89
5	31.83	33.36	0.150	72.56
6	26.53	28.35	0.176	69.35
7	22.74	24.84	0.201	66.26
8	19.89	22.26	0.225	63.31
9	17.68	20.31	0.246	60.51

- Build the circuit shown in figure 1.

In this circuit the oscilloscope channel 2 is being used to monitor the voltage across the 10Ω resistor. The voltage developed across a known resistor can be used to determine the current flow. As this channel of the oscilloscope is monitoring the current, it can be used to determine the phase angle between the supply current and voltage, that is, the difference in phase between the two waveforms on the oscilloscope.

Use this method to record the supply current and its phase angle with respect to the supply voltage.

Capacitive Circuit – Practical Results

Frequency (kHz)	Current (mA)	Time difference(ms)	Phase Angle (°)
1	307	244.8	88.128
2	616	112.9	81.288
3	937	75.3	81.324
4	118	50.8	73.152
5	158	41.4	74.52
6	181	33.9	73.224
7	201	30.1	75.852
8	231	24.5	70.56
9	250	20.7	67.068

Task 2 - Equivalent Inductance

- a) Calculate the equivalent inductance of *figure 2* shown below.

$$L1 + L2 + L3 = 7.9\text{mH} \quad /$$

- b) Simulate the circuit and measure the voltage across each inductor and current drawn by the circuit.

- c) The circuit in *figure 3* has the following currents through inductors L1, L2 and L3.

$$L1 = 40 \text{ A}$$

$$L2 = 8.7 \text{ A}$$

$$L3 = 18.26 \text{ A}$$

Calculate the value of each inductive reactance and inductor value.

$$X_{L1} = V/I_1 = 12.6/40 = 0.315\Omega$$

$$L_1 = X_{L1}/2\pi f = 0.315/(2\pi \times 50) = 1\text{mH} \quad /$$

$$X_{L2} = V/I_2 = 12.6/8.7 = 1.45\Omega$$

$$L_2 = X_{L2}/2\pi f = 1.45/(2\pi \times 50) = 4.62\text{mH} \quad /$$

$$X_{L3} = V/I_3 = 12.6/18.26 = 0.69\Omega$$

$$L_3 = X_{L3}/2\pi f = 0.69/(2\pi \times 50) = 2.20\text{mH} \quad /$$

/ SDP

- d) Simulate the circuit and compare results with calculated values.

Figure 3

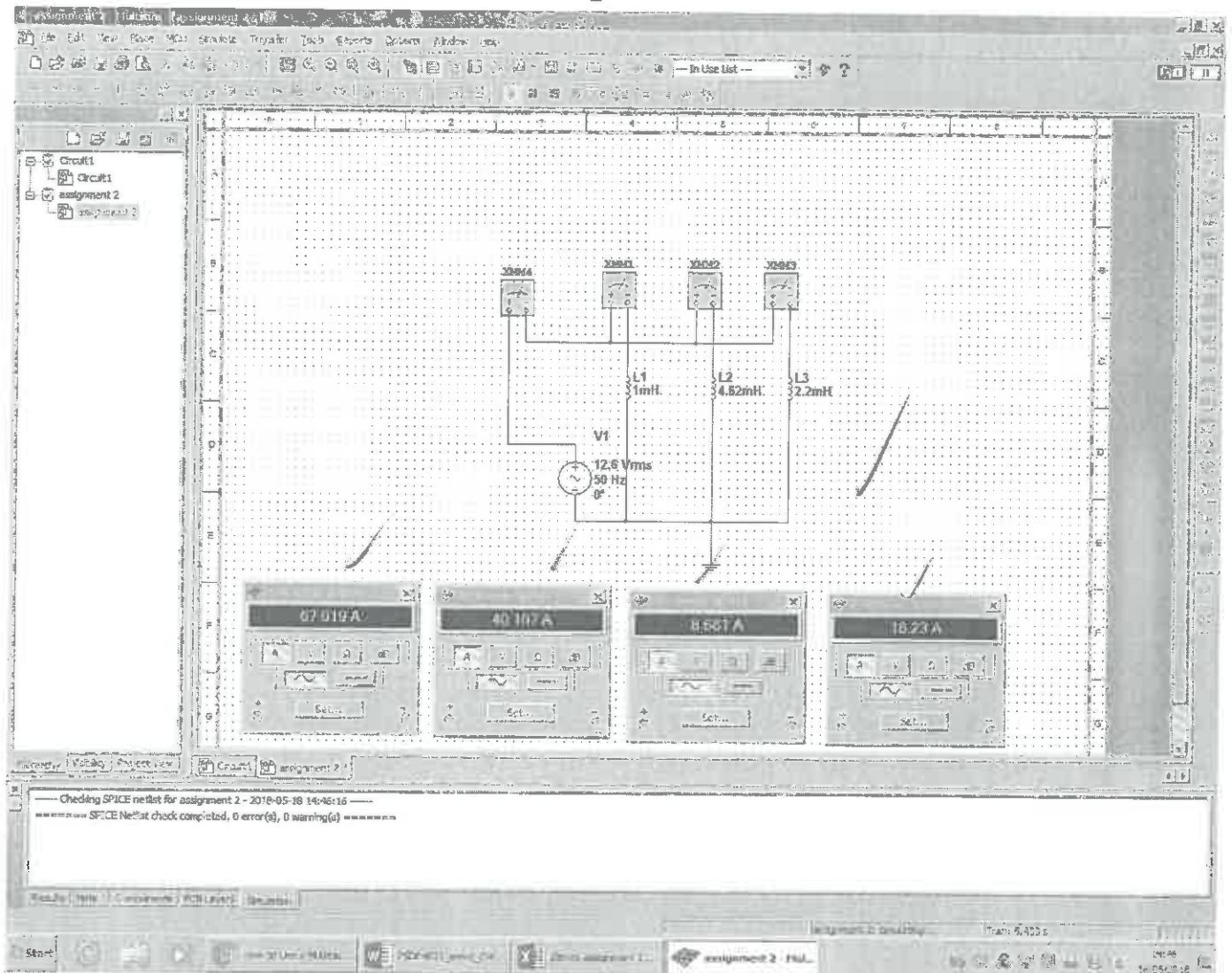
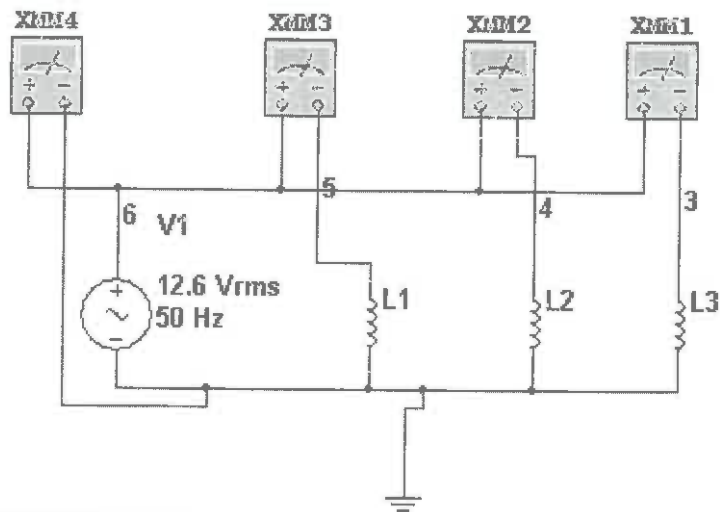
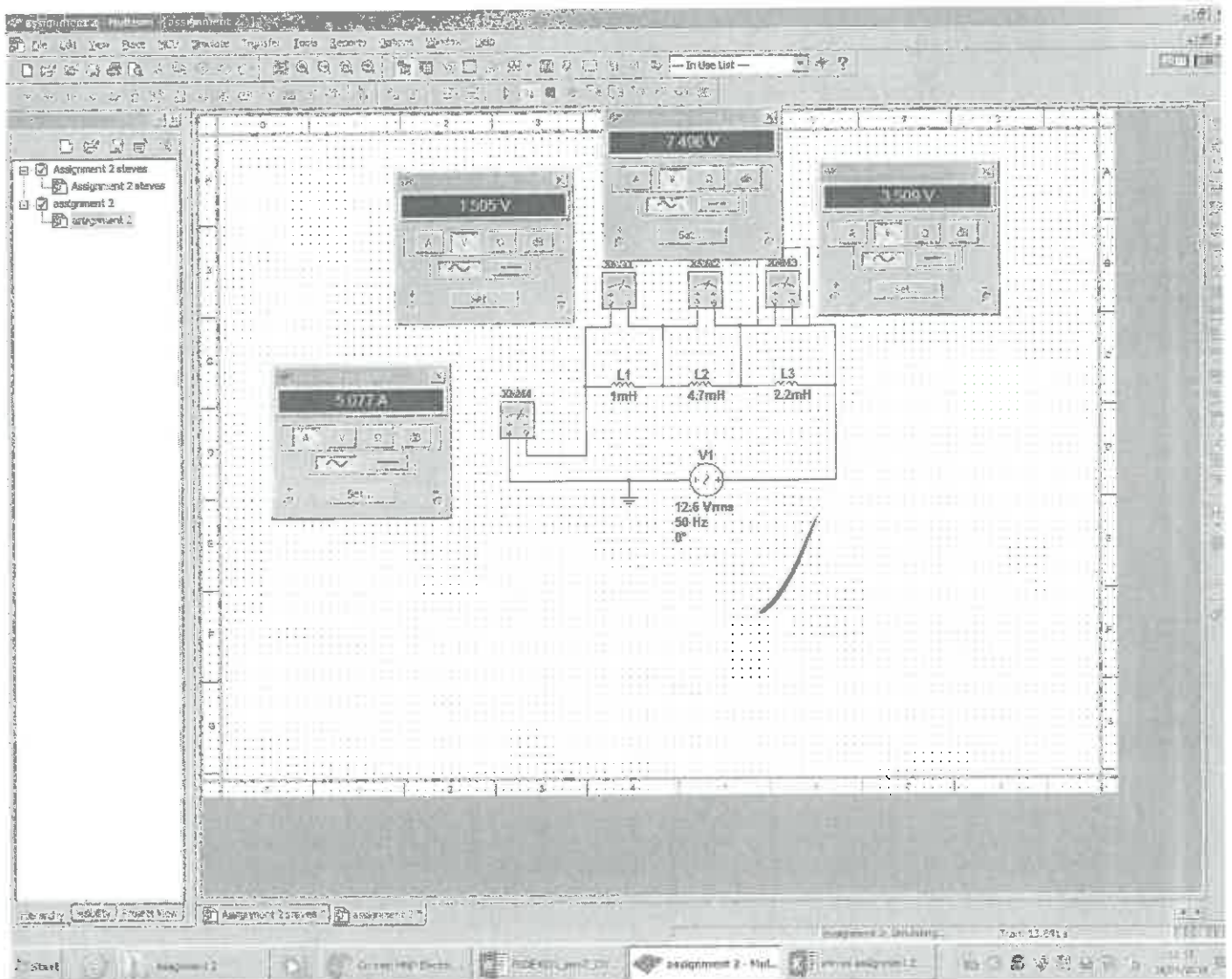
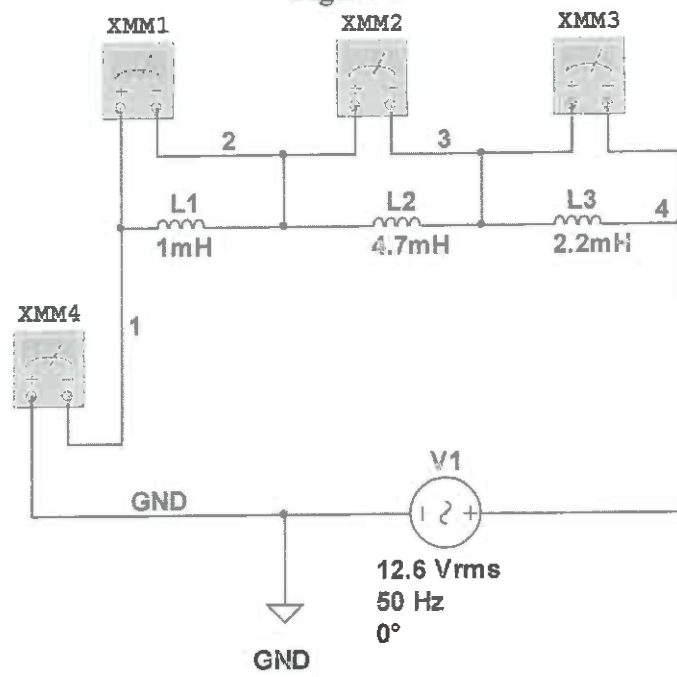
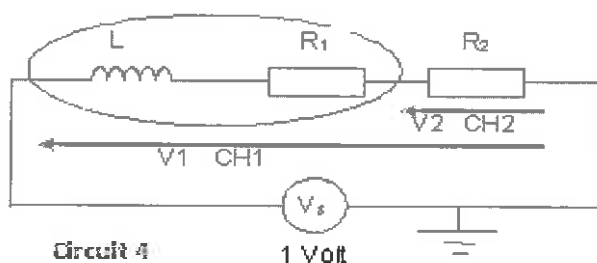


Figure 2



50P

Task 3 - RL Circuits



$L = 1 \text{ mH}$; $R_2 = 10 \Omega$; $R_1 = ? \Omega$ (measure this value)

Figure 4

- For each of the frequencies in the table below, calculate the value of impedance and hence the magnitude of the current flowing in the circuit shown in *figure 4*.
- Determine the value of the phase angle between the voltage and the current in the circuit.
 $R_1 = 2.65 \Omega$

Inductive Circuit Calculations

Frequency (kHz)	$X_L (\Omega)$	Impedance (Ω)	Current (A)	Phase Angle ($^\circ$)
1	6.283	14.124	0.0708	26.413
2	12.566	17.831	0.0561	44.809
3	18.850	22.701	0.0441	56.135
4	25.133	28.137	0.0355	63.283
5	31.416	33.867	0.0295	68.067
6	37.699	39.765	0.0251	71.451
7	43.982	45.765	0.0219	73.954
8	50.265	51.833	0.0193	75.874
9	56.549	57.549	0.0173	77.391

- Build the circuit shown in figure 4.

The oscilloscope channel 2 is being used to monitor the voltage across the 10Ω resistor. The voltage developed across a known resistor can be used to determine the current flow. As this channel of the oscilloscope is monitoring the current, it can be used to determine the phase angle between the supply current and voltage, that is, the difference in phase between the two waveforms on the oscilloscope.

Use this method to record the supply current and its phase angle with respect the supply voltage.

Inductive Circuit – Practical Results

Frequency (kHz)	Current (A)	Time difference(ms)	Phase Angle ($^\circ$)
1	0.0718	71.53	25.7508
2	0.0571	64.01	46.0872
3	0.0421	52.73	56.9484
4	0.0345	44.67	64.3248
5	0.0275	37.7	67.86
6	0.0241	32.89	71.0424
7	0.0211	30.15	75.978
8	0.0186	27.12	78.1056
9	0.0168	24.54	79.5096

Compare the theoretical and practical results. Could a multimeter be used to measure the current flow within the circuit? Why use the oscilloscope? Comment in your conclusions.

A multimeter could be used to measure the flow but it would be better using an oscilloscope because, Multimeters measure multiple electrical parameters such as voltage, current and resistance individually while oscilloscopes measure voltage over time.

An oscilloscope displays a waveform of its voltage readings while a multimeter outputs a single measurement.

Even the normal applications of Multimeter show they're used for testing and accurately checking voltage, current and resistance of common batteries, car batteries, light bulbs, electrical outlets, fuses, wires and cords while Oscilloscope are used to test for malfunctioning electronic equipment for unexpected voltage & possible faulty components by, measuring time between events, looking at signal shapes and measuring the amplitude and frequency of a signal.

Conclusions

Please give conclusions to all your practical activities. In your conclusions you should discuss any discrepancies between calculated and measured values.

There was some discrepancies in my readings for phase angle, this was most likely caused by my measurements while using the Oscilloscope as I wouldn't have been able to get exactly the correct spot as the calculations as I'm not that precise.

There were also some discrepancies in my current results this is because the Multimeter calculates the average current over a period of time, which puts the results out, also the multimeter could not have been calibrated correctly when set up which could also skew the results.

References:

Bird, J (2007) Electrical and Electronic Principles and Technology 3rd edition. Oxford. Newnes
Accessed; 18/05/2018

✓ JDP

GUIDANCE FOR STUDENTS IN THE COMPLETION OF TASKS

1. **Research-informed Literature:** You must provide evidence of individual research of component and circuit theory, selecting credible sources and application of appropriate referencing conventions.
2. **Knowledge and Understanding of Subject:** Must show an understanding of concepts and underlying principles associated with ac circuits.
3. **Analysis:** Provide analysis of the practical activities.
4. **Practical Application and Deployment:** Show the ability to perform practical work and be able to verify circuit operation against calculated and theoretical results.
5. **Skills for Professional Practice:** Your work should be well organised and presented in a professional manner.

Compare the theoretical and practical results. Could a multimeter be used to measure the current flow within the circuit? Why use the oscilloscope? Comment in your conclusions.

A multimeter could be used to measure the flow but it can also be done using an oscilloscope because, while Multimeters measure multiple electrical parameters such as voltage, current and resistance individually, the oscilloscope can measure current by using the voltage drop across a series resistor. The oscilloscope also has a high impedance which doesn't affect the circuit

Conclusions

Please give conclusions to all your practical activities. In your conclusions you should discuss any discrepancies between calculated and measured values.

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Taflen Cyflwyno Aseiniad Assignment Hand in Sheet

MANYLION Y MYFYRIWR STUDENT'S DETAILS			
ENW: NAME:		RHIF P Y MYFYRIWR: STUDENT P NUMBER:	P
CWRS: COURSE:	Foundation Year/HNC/HND/FdSc/BEng/BSc/MEng/MComp/MSc * <i>dileer fel y bo'n berthnasol / delete as appropriate</i>	LEFEL Y CWRS: LEVEL OF COURSE:	4
MODIWL: MODULE:	ELECTRICAL TECHNOLOGY PSDE4021		
TEITL YR ASEINIAD: ASSIGNMENT TITLE:	AC Circuit Lab		
DARLITHIWR/WYR: LECTURER/S:	Steve Roberts	DYDDIAD: DATE:	
Staff Llyfrgell YN UNIG / Library Staff ONLY			
Derbynwyd gan / Accepted by: _____ Dyddiad Cyflwyno / Date Submitted: _____ Amser / Time: _____			

DERBYNNEB / RECEIPT			
ENW / NAME:		RHIF P Y MYFYRIWR: STUDENT P NUMBER:	P
CWRS / COURSE:	Foundation Year/HNC/HND/FdSc/BEng/BSc/MEng/MComp/MSc * <i>dileer fel y bo'n berthnasol / delete as appropriate</i>	LEFEL Y CWRS / LEVEL OF COURSE:	4
MODIWL / MODULE:	Electrical Technology PSDE4021		
TEITL YR ASEINIAD: ASSIGNMENT TITLE:	AC Circuit Lab		
DARLITHIWR/WYR: LECTURER/S:	Steve Roberts	DYDDIAD / DATE:	
Staff Llyfrgell YN UNIG / Library Staff ONLY			
Derbynwyd gan / Accepted by: _____ Dyddiad Cyflwyno / Date Submitted: _____ Amser / Time: _____			

