

# Electrical and Electronic Principles Assignment ACDA4002

*by* Ashley Hughes

---

|                |                                                                                                             |                 |       |
|----------------|-------------------------------------------------------------------------------------------------------------|-----------------|-------|
| FILE           | 5991_ASHLEY_HUGHES_ELECTRICAL_AND_ELECTRONIC_PRINCIPLES_ASSIGNMENT___ACDA4002_84539_1967655612.DOCX (1.87M) |                 |       |
| TIME SUBMITTED | 14-JAN-2018 06:42PM (UTC+0000)                                                                              | WORD COUNT      | 287   |
| SUBMISSION ID  | 81676261                                                                                                    | CHARACTER COUNT | 14 19 |

---

# **Electrical & Electronic Principles**

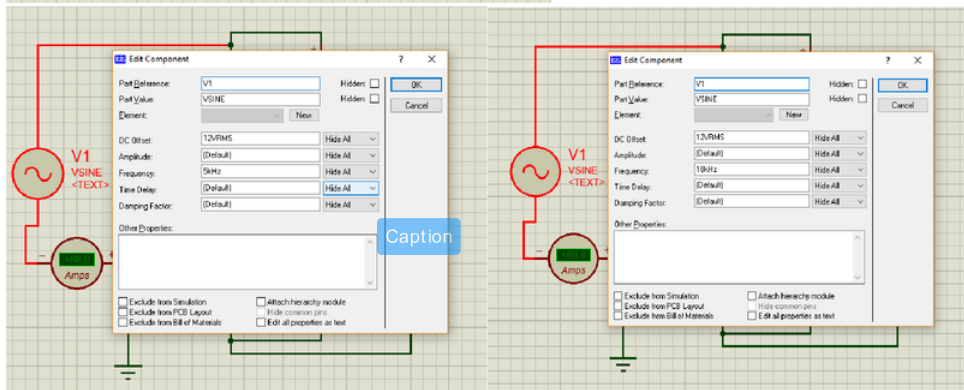
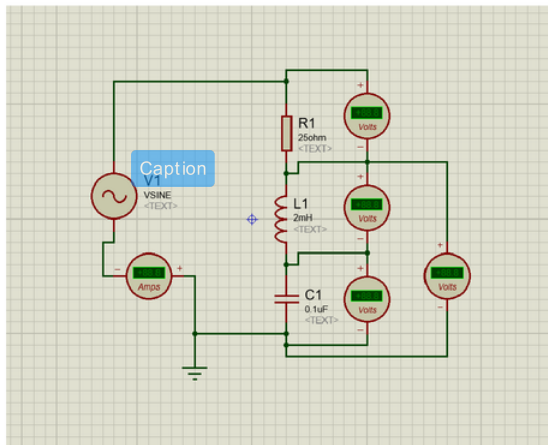
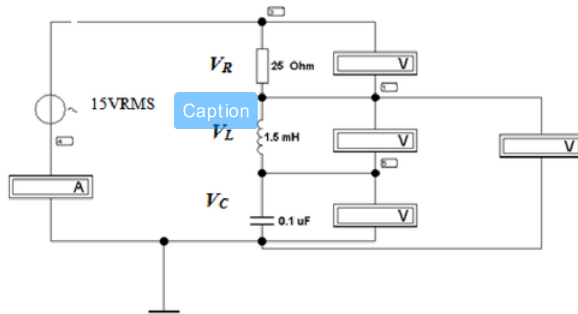
---

**Submitted to:**  
**Dr Steve Mosey**  
**School of Applied Computing**

**Submitted by:**  
**Ashley Hughes**  
**P149519**

## Intro

Using a simulation software such as Proteus, a circuit will be created following the diagram provided to measure a range of results. Those results will then be recorded in a table for use in a graph later. Using equations to find the resonant frequency and Q they will then be compared to the measured results. A resonant frequency is a small periodic driving force that has an ability to create large amplitude oscillations. "Q" or Q factor is a dimensionless parameter that shows how underdamped a resonator or oscillator is as well as show a resonators bandwidth relative to its frequency.



| Frequency (f) kHz | V <sub>C</sub> (Volts) | V <sub>R</sub> (Volts) | V <sub>L</sub> (Volts) | V <sub>LC</sub> (Volts) |
|-------------------|------------------------|------------------------|------------------------|-------------------------|
| 5                 | 11.9                   | 0.09                   | 0.02                   | 11.9                    |
| 6                 | 11.8                   | 0.13                   | 0.05                   | 11.9                    |
| 7                 | 11.7                   | 0.18                   | 0.12                   | 11.8                    |
| 8                 | 11.5                   | 0.25                   | 0.28                   | 11.8                    |
| 9                 | 11.0                   | 0.36                   | 0.67                   | 11.7                    |
| 10                | 9.52                   | 0.50                   | 2.03                   | 11.5                    |
| 11                | 6.54                   | 0.17                   | 5.37                   | 11.9                    |
| 12                | 9.08                   | -0.48                  | 3.40                   | 12.5                    |
| 13                | 10.8                   | -0.42                  | 1.58                   | 12.4                    |
| 14                | 11.4                   | -0.33                  | 0.94                   | 12.3                    |
| 15                | 11.6                   | -0.26                  | 0.65                   | 12.3                    |
| 16                | 11.8                   | -0.22                  | 0.48                   | 12.2                    |
| 17                | 11.8                   | -0.19                  | 0.38                   | 12.2                    |
| 18                | 11.9                   | -0.17                  | 0.34                   | 12.1                    |

$$f = \frac{1}{2\pi\sqrt{LC}} = \frac{1}{2\pi\sqrt{2 \times 10^{-3} \times 0.1 \times 10^{-6}}} = 11.2\text{kHz}$$

$$BW = f_H - f_L = 12 - 10 = 2$$

$$Q = \frac{fr}{BW} = \frac{11}{2} = 5.5$$

$$Q = \frac{1}{R\sqrt{L} \div C} = \frac{1}{25\sqrt{2} \times 10^{-3} \div 0.1 \times 10^{-6}} = 2.82$$

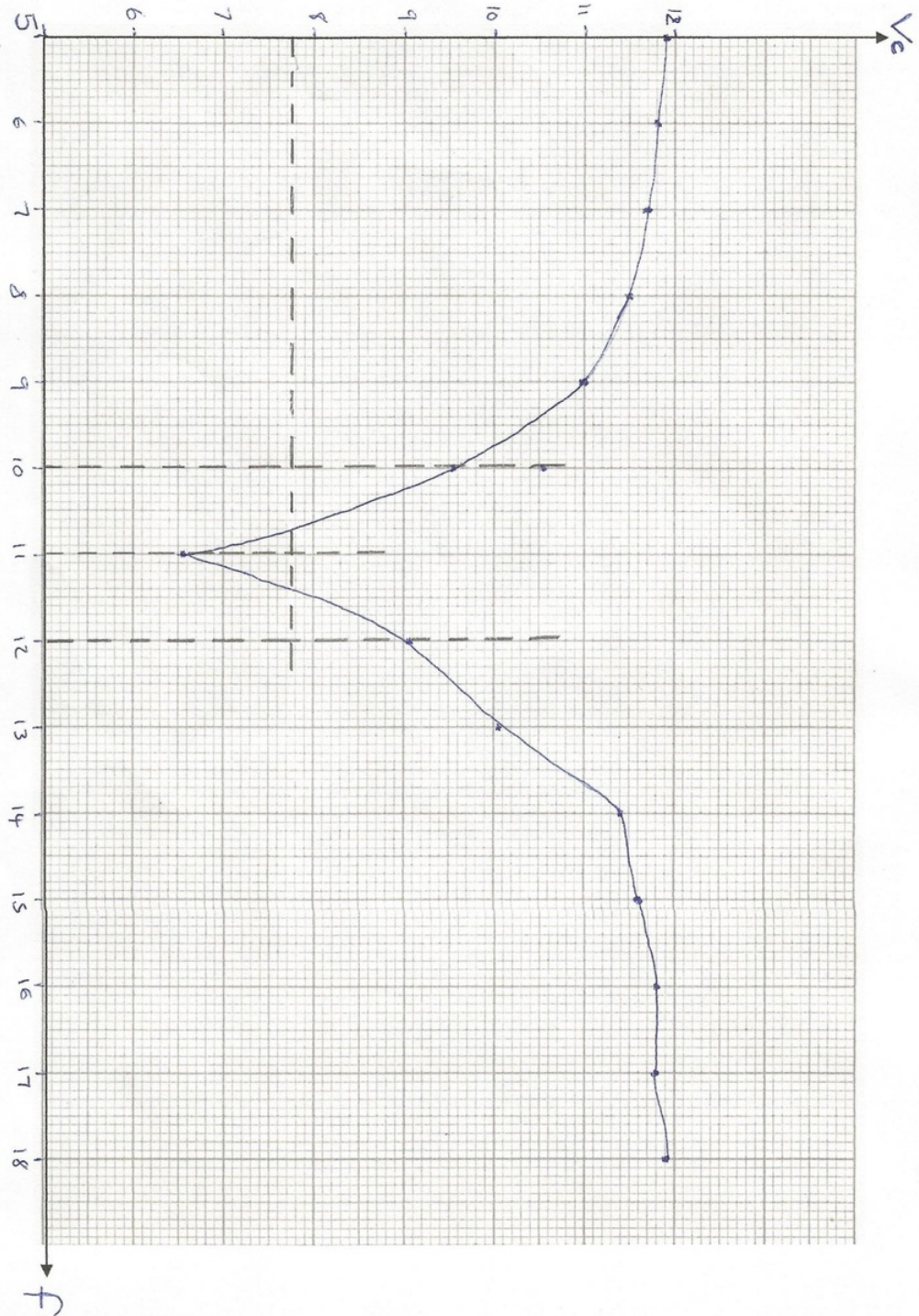
#### Comparison of Theoretical and Measured Resonant Frequency

When using the equation  $f = \frac{1}{2\pi\sqrt{LC}}$  to get a theoretical result, I ended up with an answer of 11.2kHz. Comparing this to the measured result I had of 11kHz shows they are both within a 10% margin of each other.

#### Comparison of Theoretical and Calculated "Q".

Looking at the results for both theoretical and calculated "Q" they are very close figures. The calculated result being 2.82 is near enough half of the theoretical result 5.5.

WRITE YOUR NAME HERE:.....



# Electrical and Electronic Principles Assignment ACDA4002

## GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

**Instructor**

**37** /100

PAGE 1

PAGE 2

QM

**Caption**

Caption?

QM

**Caption**

Caption?

QM

**Caption**

Caption?

PAGE 3

PAGE 4

GRADING FORM: SMU GENERIC\_GJ

**ASHLEY HUGHES**

**36.60**

## RESEARCH-INFORMED LITERATURE



Little or no evidence of reading. Views and findings unsupported and non-authoritative. Referencing conventions largely ignored.

## KNOWLEDGE AND UNDERSTANDING

 Evidence of basic knowledge and understanding of the relevant concepts and underlying principles. **10**

## ANALYSIS

 Experimental results have been presented but not analysed in any way. You have not given any reasoning behind the comparison between measured and calculated results. **8.75**

## PRACTICAL APPLICATION AND DEP.

 An adequate awareness and mostly appropriate application of well-established methods, materials, tools and/or techniques. Basic appreciation of the context of the application. **12.6**

## SKILLS FOR PROFESSIONAL PRAC.

 Media is poorly designed and/or not suitable for the audience. Work lacks structure, organisation, and/or coherence. **5.25**