

# COMMONWEALTH OF AUSTRALIA

## Copyright Regulations 1969

### Warning

This material has been reproduced and communicated to you by or on behalf of *The Charles Darwin University* pursuant to Part VB of the *Copyright Act 1968* (the Act). The material in this communication may be subject to copyright under the Act. Any further reproduction or communication of this material by you may be the subject of copyright protection under the Act.

Do not remove this notice



Family Name	
Given Names	
Student Number	
Teaching Period	Semester 1, 2016

<b>FINAL EXAMINATION</b>	<b>DURATION</b>				
<b>STA510 – Business Statistics</b>	<table border="1"> <tr> <td>Reading Time:</td> <td><b>10</b> minutes</td> </tr> <tr> <td>Writing Time:</td> <td><b>180</b> minutes</td> </tr> </table>	Reading Time:	<b>10</b> minutes	Writing Time:	<b>180</b> minutes
Reading Time:	<b>10</b> minutes				
Writing Time:	<b>180</b> minutes				

**INSTRUCTIONS TO CANDIDATES**

**EXAM CONDITIONS**

**You may begin writing from the commencement of the examination session.** The reading time indicated above is provided as a guide only.

This is a CLOSED BOOK examination

Any calculator is permitted

No handwritten notes are permitted

No dictionaries are permitted

<b>ADDITIONAL AUTHORISED MATERIALS</b>	<b>EXAMINATION MATERIALS TO BE SUPPLIED</b>
No additional printed material is permitted	1 x 16 Page Book Graph Paper Formula Sheets

**THIS EXAMINATION IS PRINTED  
DOUBLE-SIDED.**

**THIS PAGE HAS BEEN INTENTIONALLY  
LEFT BLANK.**

## **Section A**

### **Multiple Choice Questions**

**Total Marks for this section: 20**

**Each question is worth 1 mark**

This section should be answered on the Answer Booklet provided. Please ensure that your name and student number have been written on the Answer Booklet.

Suggested Time allocation for Section A: 40 mins

---

## Section B

### Short Questions

**Total Marks for this section: 20**

This section should be answered in the Answer Booklet provided. **You are required to answer any FOUR of the SIX short questions.** Each question is worth 5 marks.

Suggested Time allocation for Section A: 100 mins

---

#### Question 1

Table below provides mean and variance of returns on investment for General Electric, Seagram, Coco-Cola and McDonalds' based on 48 months record.

	General Electric	Seagram	Coco-Cola	McDonalds
Means	0.0231	0.0148	0.0213	0.0156
Variances	0.0019	0.0043	0.0017	0.0025

Answer the following questions using the information presented in the table above.

- (a) Which share would you recommend for an investor who wishes to maximise his expected return and why? (2.5 marks)
- (b) If an investor wishes to minimise his risk, which share would you recommend and why? (2.5 marks)

#### Question 2

- (a) Calculate the mean, variance, standard deviation and coefficient of variation for the following sample of data. You must show your calculations. (2 marks)

5    7    12    14    15    15    17    20    21    24

- (b) If we drop the largest value from the sample, what will happen to the mean, variance, standard deviation and coefficient of variation and what will be the new values? (2 marks)
- (c) Is it possible for the standard deviation to be negative? Explain, why? (1 mark)

### Question 3

- (a) Discuss the difference between a census and a sample. (1 mark)
- (b) Outline the advantages and disadvantages of sampling. (1 mark)
- (c) Discuss the steps or process involved in sampling design process. (1 marks)
- (d) What do you mean by sampling and non-sampling errors? Discuss. (2 marks)

### Question 4

The female Associate Professor at an Australian University recently complained about the recent round of promotions from Associate Professor to Professor. An analysis of the relations between gender and promotion was undertaken, with probabilities presented in the table below:

	Those promoted to Professor	Those not promoted to Professor
Female	0.03	0.12
Male	0.17	0.68

- (a) What is the rate of promotion among female Associate Professor? (2 marks)
- (b) What is the rate of promotion among male Associate Professor? (2 marks)
- (c) How correct is the accusation that the university is a gender biased workplace? Discuss. (1 mark)

### Question 5

More people are using social media to network, rather than making phone calls or even email. Jobseekers are now searching and applying for jobs online. Three years ago, 40% of jobseekers applied for jobs online. A survey conducted recently found 67 out of 150 people surveyed applied for jobs online. Use the output that follows to test at the 5% level of significance whether the proportion of job seekers applying online has increased from three years ago.

<b>z-Test of a Proportion</b>			
<b>Sample proportion</b>		<b>z Stat</b>	<b>1.17</b>
<b>Sample size</b>	150	<b>P(Z&lt;=z) one-tail</b>	<b>0.1217</b>
<b>Hypothesized proportion</b>	0.4	<b>z Critical one-tail</b>	<b>1.6449</b>
<b>Alpha</b>	0.05	<b>P(Z&lt;=z) two-tail</b>	<b>0.2433</b>
		<b>z Critical two-tail</b>	<b>1.9600</b>

- (a) Write down the null and alternative hypotheses for this test. (1 mark)
- (b) The sample proportion value is missing in the output above. What is this value? (1 mark)
- (c) Use either the  $p$ -value or the  $z$  statistic in the output provided above to perform the test. What is your conclusion? Has the proportion of job seekers increased? (3 marks)

### Question 6

A light bulb manufacturer claims that less than 5% of his bulbs are defective. When 1000 bulbs were drawn from a large production run, 1% was found to be defective. Using this information, answer the following questions.

- (a) What is the population of interest? (1 mark)
- (b) What is the sample? (1 mark)
- (c) What is the parameter and the statistic? (1 mark)
- (d) Does the value of 5% refer to parameter or statistic? (1 mark)
- (e) Is the value of 1% a parameter or a statistic? (1 mark)

## Section C

### Case Study / Hypothesis Testing

Total Marks for this section: 10

This section should be answered in the Answer Booklet provided. **You are required to answer only ONE of the TWO questions in this section.**

Suggested Time allocation for Section C: 40 mins

---

#### Question 1

An environment specialist proposed that one way of reducing carbon emissions into the environment is by introducing a new carbon tax on motor vehicle ownership. He proposed the following taxation rates (see, Table 1) based on the number of motor vehicles per dwelling.

Table 1: Proposed carbon tax

Number of motor vehicles per dwelling	Proposed carbon tax per year
0	\$0
1	\$100
2	\$400
3	\$1000
4 or more	\$2000

The Government's advisor was interested on this proposal as it would generate revenue and reduce carbon emissions. He asked his research officer to collect data on motor vehicles ownership per dwelling to work out the expected revenue from this proposal. The adviser indicated his willing to consider the proposal if the total tax revenue exceeds \$100 million (\$100,000,000).

According to the Australian Bureau of Statistics' 2011 *Census of Population and Housing*, the following are the data on motor vehicles ownership by dwellings (see, Table 2). The total number of dwelling in Australia is 9117033.



Table 2: Motor vehicles ownership per dwelling

Number of motor vehicles	Percentage of dwellings
0	0.086
1	0.358
2	0.361
3	0.165
4 or more	0.30

- (a) Will the Government's advisor consider the environmental specialist's proposal to introduce a new carbon tax on motor vehicle ownership?

Write a report indicating the total amount of revenue the proposed carbon emissions tax is likely to generate from each groups of vehicle owners. Present this data in a table and also in an appropriate hand drawn graph. Also discuss what other benefits the proposed tax may bring, in addition to additional revenue and reduced emissions. (8 marks)

- (b) If the proposed tax rate presented in the table 1 above is reduced by 50% will the tax revenue still be higher than \$100 million? Show your calculations in answering this question.

(2 marks)

## Question 2

An Australian university claims that the average entry score of the Bachelor of Accounting Program's applicants has increased in the last three years. Three years ago the mean and the standard deviation of the Bachelor of Accounting Program's applicants were 920 and 20, respectively. In a sample of 36 of this year's applicants for the program, the mean score was 925. At the 5% level of significance, can we conclude that the University's claim is true? (Assume that the standard deviation has not unchanged.) [Hint: Decision Rule: Reject  $H_0$  if  $z > 1.645$ .]

- (a) State the null and alternative hypotheses to be tested. (3 marks)
- (b) Is the University claim true? Why? Why not? Discuss. (7 marks)

**END OF EXAM**