# Silence Please

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## CIT Semester 1 Examinations 2018/19

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| **Note to Candidates:** | Check the Programme Title and the Module Description to ensure that you have received the correct examination. If in doubt please contact an Invigilator. |
| **Module Title:** | **Essential Maths& Stats for Bus** |
| **Module Code:** | **MATH6051** |
| **Programme Title(s):** | BBus Y1<br>BBus Business Admin Y1<br>BBus Business Admin PT Y1 |
| **Block Code(s):** | **BBUSS_7_Y1** **BBADM_7_Y1** **BBUAD_7_Y1** |
| **External Examiner(s):** | **Dr. Katarina Domijan** |
| **Internal Examiner(s):** | Ms. Katie Bullen, Mr. Declan O Connor, Dr. Shane O Rourke, Ms. Gráinne Read, Mrs. Patricia Cogan, Dr. Mark Hartnett, Dr. Catherine Palmer |
| **Instructions:** | Answer ALL questions.<br>Question 1 carries 40 marks. Questions 2 and 3 carry 30 marks each.<br>Do not use RED pen.<br>Show all calculations and workings in full.<br>Please include your class group and lecturer's name on the front cover of each answer book. |
| **Duration:** | 2 Hours |
| **Required Items:** | Calculator |

**Question 1**

Answer all parts

(a) A profit of 23% was made on an item sold in a local retail store. If the cost to produce the item was €92, calculate the following:

(i) The profit on this item.

**(3 marks)**

(ii) The selling price of this item.

**(3 marks)**

(b) A businessman has borrowed money at a quarterly rate of 2% compounded quarterly. If he owes €63,412.09 after 3 years:

(i) How much money did he borrow initially?

**(4 marks)**

(ii) Calculate the interest paid on the loan.

**(3 marks)**

(c) The profits of a company were divided between its three directors John, Shane and Chris in the ratio of 5 : 5 : 2.5. If Chris received €50,000 for 2017, find:

(i) The total profit earned by the company in 2017.

**(3 marks)**

(ii) If Chris invested this €50,000 in the United States at an exchange rate of €1 = $1.15. What was his investment worth in US dollars?

**(3 marks)**

(d) Expand the brackets and simplify the expression

$$4x - 2[5y - x + 3(2x - y)]$$

**(4 marks)**

(e) Transpose the formula for *m* (make *m* the subject of the formula):

$$E = \frac{mv^2}{2} + mgh$$

**(5 marks)**

(f) Simplify the following expression and write your answer using positive indices.

$$\left(\frac{32x^2y^2}{16x^2y^3}\right)^2$$

**(4 marks)**

(g) Find the slope and *y*-intercept of the following line

$$2y = 4x + 7$$

**(4 marks)**

(h) Solve the following equation for *x*:

$$\frac{2x-3}{4} = \frac{3x-2}{5}$$

**(4 marks)**

**Question 2**

(a) The following information was recorded with regard to the number of visitors to a popular region in the 'Irish Atlantic Way' 2013 – 2016

| Year | **2013** | **2014** | **2015** | **2016** |
|---|---|---|---|---|
| Number of Visitors | 95,400 | 120,560 | 138,970 | 153,530 |

(i) Construct a simple index for the number of visitors to the region using the year 2013 as the base year. **(4 marks)**

(ii) What was the percentage change in the number of visitors from 2013 to 2016? **(2 marks)**

(iii) What was the percentage change in the number of visitors from 2015 to 2016? **(2 marks)**

(b) The table below gives the overtime worked by a group of craftsmen in *Munster Craftworks* during each of the 48 working weeks in a year.

| Overtime Worked (no. of Hours) | Frequency |
|---|---|
| 25 but less than 30 | 5 |
| 30 but less than 35 | 4 |
| 35 but less than 40 | 7 |
| 40 but less than 45 | 11 |
| 45 but less than 50 | 12 |
| 50 but less than 55 | 8 |
| 55 but less than 60 | 1 |

(i) Establish a cumulative frequency distribution for the data and plot the corresponding Ogive, (use graph paper in the centre of your answer booklet) **(11 marks)**

(ii) Use your graph to estimate the median amount of overtime worked. **(2 marks)**

(iii) Use your graph to estimate the interquartile range. What does the interquartile range represent? **(5 marks)**

(iv) Estimate the percentage of weeks that overtime was greater than 48hours. **(2 marks)**

(v) Estimate the percentage of weeks that overtime was less than 24hours. **(2 marks)**

**Question 3**

(a) The following set of data refers to the amount of money in €s taken by a coffee dock for 6 days.

{27.90, 34.70, 54.40, 18.92, 47.60, 39.68}

(i) Determine the mean, median and modal values of the set. **(5 marks)**

(ii) Determine the standard deviation from the mean, clearly showing your workings. **(5 marks)**

(iii) Would you consider any of the data to be outliers? How would you test for outliers? **(2 marks)**

(b) The time taken in minutes by 50 students to complete an in-class assessment is recorded and the results are shown.

| Time Taken (mins) | Frequency |
|---|---|
| 5 but less than 15 | 6 |
| 15 but less than 20 | 22 |
| 20 but less than 25 | 18 |
| 25 but less than 30 | 4 |

(i) Draw a histogram depicting this data, (use graph paper in the centre of your answer booklet) **(8 marks)**

(ii) Hence, determine the mean, median and modal values of the distribution showing all your workings. **(10 marks)**

**Formulae:**

**Compound Interest** $\boldsymbol{A = P\,(1 + i)^n}$

**Coordinate Geometry**

**Slope:** $\boldsymbol{m = \frac{y_2 - y_1}{x_2 - x_2}}$

**Equation of the line:** $\boldsymbol{y - y_1 = m(x - x_1)}$

**<u>Statistical Formulae</u>:**

**Mean** $\mu = \frac{\sum x}{n}, \quad \mu = \frac{\sum fx}{\sum f}$

**Standard Deviation**

$$\sigma = \sqrt{\frac{\sum (x-\mu)^2}{n}}, \qquad \sigma = \sqrt{\frac{\sum f(x-\mu)^2}{\sum f}} \qquad \sigma = \sqrt{\frac{\sum (fx^2)}{\sum f} - \left(\frac{\sum (fx)}{\sum f}\right)^2}$$

**Median** $L_M + C_M\left(\frac{\frac{1}{2}(N) - F_{M-1}}{f_M}\right)$

**Mode** $L_M + C_M\left(\frac{f_M - f_{M-1}}{2f_M - (f_{M-1} + f_{M+1})}\right)$

**Coefficient of Variation** $\frac{\sigma}{\mu} \times 100$

**Coefficient of Skewness** $\frac{3(Mean - Median)}{Standard\ Deviation}$