FINAL
Alternative Assessment

(COVER PAGE)

Session	:	**April 2022**
Programme	:	Foundation in Business (CFB)
Course	:	**MAT1215: Fundamentals of Mathematics**
Date of Examination	:	4 August 2022 (Thursday)
Time	:	9:00am – 11:30am Reading Time : Nil
Duration	:	2 hours + 30 minutes (uploading time)
Special Instructions	:	

This paper consists of **FIVE (5)** questions. Answer **ALL FIVE (5)** questions.
All questions carry equal marks. Show complete workings.

Materials permitted :

Non-programmable calculator

Materials provided :

Nil

Examiner(s)	:	**Mr. Bark Chee Beng**
Chief Moderator	:	Ms. Teng Mei Tuan

*This paper consists of **6** printed pages, including the cover page.*

INTI INTERNATIONAL COLLEGE PENANG
FOUNDATION IN BUSINESS (CFB)
MAT1215 : FUNDAMENTALS OF MATHEMATICS
FINAL EXAMINATION: APRIL 2022 SESSION

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Question 1

(a) Given that $A = \left\{-2,\ \frac{6}{2},\ \sqrt{13},\ 1.33,\ \sqrt{36},\ 2\pi,\ \frac{11}{3}\right\}$

(i) Set of even integer(s)

(2 marks)

(ii) Set of irrational number(s)

(2 marks)

(b) Evaluate $-|2.6| - |-3 + 2.3| + |-1.1|$.

(4 marks)

(c) Simplify each expression:

(i) $(6 + 7x^2 + 2x^3 - 8x^4) - (3x^4 + 3x^3 - 3x^2 - 3x)$

(3 marks)

(ii) $\sqrt{50} - 7\sqrt{2} + \sqrt{32}$

(4 marks)

(d) Factorize each expression completely:

(i) $2x^4 + 8x^3 + 8x^2$

(3 marks)

(ii) $x^3 - 5x^2 + 6x - 30$

(2 marks)

Question 2

(a) Convert the following scientific notation to decimal notation.

(i) 6.27×10^{-4}

(1 mark)

(ii) 2.1101×10^{8}

(1 mark)

(b) Convert the following decimal notation to scientific notation.

(i) 3838230020

(1 mark)

(iii) 0.00120012

(1 mark)

(c) Rationalize the denominator of the term $\frac{\sqrt{5}-1}{\sqrt{5}+1}$.

(4 marks)

(d) Simplify each of the following and express your answer in positive exponents only.

(i) $\left(\frac{3x^4y^{-3}}{2x^{-1}y^2}\right)^2$

(5 marks)

(ii) $\left(9x^{-4}y^{\frac{2}{3}}\right)^{\frac{1}{2}}$

(4 marks)

(e) Expand and simplify the polynomial $(p-2q)(q-2p)$.

(3 marks)

Question 3

(a) Solve the following linear programming problem graphically:

Minimize : $2x + 3y$

Subject to: $5x + 3y \geq 150$
$2x + 5y \geq 80$
$x \geq 0,\ y \geq 0$

(7 marks)

(b) A manufacturer of a printer company is producing 2 models of printer, namely model *A* and model *B*. Two main critical components, namely component 1 and component 2 will be used in the assembly of both the printer models. To produce one unit of printer model *A*, 5 units component 1 and 3 units of component 2 are required, whereas to produce one unit of printer model *B*, 1 unit component 1 and 4 units of component 2 are required. The information been listed in table below:

	The respective components quantity required to assemble one unit of each printer model	
Printer model	Component 1	Component 2
Model *A*	5	3
Model *B*	1	4

To fulfill the minimum forecast orders, the manufacturer plan to produce at least 25 units model *A* printer and at least 25 units of model *B* printer.

However, due to the limitation of production machines capacity, a maximum 250 units component 1 and a maximum of 300 units of component 2 can be loaded.

Let *x* and *y* denote the number of units of model *A* printer and model *B* printer produced respectively in a day.

(i) Write down the four inequalities which satisfy the above conditions.

(4 marks)

(ii) Draw the graph for the four inequalities. Hence shade the region *R* which satisfies the above conditions.

(5 marks)

(iii) If a unit of model printer *A* and a unit of model printer *B* is sold for RM30 and RM40 respectively, find the maximum revenue the manufacturer can make in a day.

(4 marks)

Question 4

(a) Given the matrices $A = \begin{bmatrix} 1 & -4 \\ 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 5 \\ -3 & -2 \end{bmatrix}$, $C = \begin{bmatrix} -k & 7 \\ 4 & 3 \end{bmatrix}$, and $D = \begin{bmatrix} 6 & 7 \\ -ke & 3 \end{bmatrix}$, find

(i) $AB - 2B$.

(3 marks)

(ii) the value of k if C has no inverse.

(2 marks)

(iii) the value of k and e if $C = D$.

(3 marks)

(b) Solve the following system by inverse of the coefficient matrix:

$$\begin{aligned} 4x + 3y &= 2 \\ 2x + 5y &= 8 \end{aligned}$$

(6 marks)

(c) Solve the following system of equations using Cramer's rule:

$$\begin{aligned} 2x + 3y &= 7 \\ 7x + 4y &= 18 \end{aligned}$$

(6 marks)

Question 5

(a) A total of 30 college students in a class were asked whether they are taking Accounts(A) and/or Business(B) subject(s), and the information obtained is given below:

$$n(A \cap B) = 12,\ n(A) = 19,\ n(B) = 18$$

(i) Represent the information in a Venn Diagram.

(3 marks)

(ii) Find the number of students that are taking Business only.

(1 mark)

(iii) Find the number of students that are taking Accounts or Business.

(2 marks)

(iv) Find the number of students that are neither taking Accounts nor taking Business.
(2 marks)

(b) Given a 9-letter word 'EXCELLENT'.

Find the number of ways

(i) to select 3 letters,
(2 marks)

(ii) to select 3 letters, if no repeating letter is allowed.
(3 marks)

Find the number of different arrangements for

(iii) all letters,
(3 marks)

(iv) if letter E must be together.
(4 marks)

-- THE END –

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