FINAL ALTERNATIVE ASSESSMENT
Examination Paper

(COVER PAGE)

Session	:	**August 2020**
Programme	:	Diploma in Information Technology (DITN) Diploma in Computer Science (DCS)
Course	:	**MAT1103: Fundamentals of Mathematics**
Date of Examination	:	December 15, 2020 (Tuesday)
Time	:	12:00noon – 2:30pm Reading Time : Nil
Duration	:	2 Hours : 30 Minutes

Note: 30 minutes is added into the duration of the examination to factor in any connectivity matters and for you to scan and upload your scripts.

Special Instructions :

This **ALL FOUR (4)** questions. All questions carry equal marks.

Materials permitted :

Non programmable calculator

Materials provided :

Nil

Examiner(s)	:	**Mohd Hafis Bin Zakaria** , Teng Meng Tuan & Dr. Narinderjit Singh a/l Sawaran Singh
Moderator	:	S.M. Elizabethrani Allappan

*This paper consists of **5** printed pages, including the cover page*

DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
DIPLOMA IN COMPUTER SCIENCE PROGRAMME (DCS)
MAT1103: FUNDAMENTALS OF MATHEMATICS
FINAL ALTERNATIVE ASSESSMENT: AUGUST 2020 SESSION

Instruction: This paper consists of **TWO (2)** sections. Answer **ALL** questions. All questions carry equal marks.

Section A: (50 marks)

Question 1

(a) Solve the expression below to the simplest form and rewrite using only positive exponents.

(i) $\left(\frac{x^{-3}}{y^{-5}z}\right)\left(\frac{x^{-1}y^{-1}z^{-3}}{x^{-7}y^{-5}z}\right)^{4}$ (4 marks)

(ii) $\sqrt{32}+\sqrt{200}-\sqrt{27}$ (3 marks)

(iii) $\frac{\sqrt{2}+\sqrt{5}}{\sqrt{5}-\sqrt{2}}$ (3 marks)

(iv) $\frac{5x-15}{4x} \div \frac{9-x^2}{6x^2}$ (3 marks)

(b) Solve the following inequalities.

(i) $-4 < 5-3x \leq 7$ (3 marks)

(ii) $2\left|\frac{2x-4}{5}\right| > 3$ (4 marks)

(c) Find the equation of the line that is perpendicular to the line $3x+4y=5$ and passes through the point $(-1,3)$.

(5 marks)
(Total: 25 marks)

Question 2

(a) Find the gradient, x and y intercepts for the equation, $x = -\frac{3}{4}y + 2$. (3 marks)

(b) Let $f(x) = x + 3$ and $g(x) = 2x^2 + 5$. Solve the following:

(i) $(f - g)(2)$ (2 marks)

(ii) $(f.g)(2)$ (2 marks)

(iii) $(f \circ g)(2)$ (3 marks)

(c) Sketch the graph of the function $y = -x^2 - 2x + 8$ with the x-intercept, y-intercept and vertex shown clearly.

(7 marks)

(d) Solve the following equations for x.

(i) $4^{2x+1} = 5^{1-3x}$ (Correct to 4 decimal places) (4 marks)

(ii) $\log_{10} x + \log_{10}(x - 3) = \log_{10} 18$ (4 marks)

(Total: 25 marks)

SECTION B: (50 marks)

Question 3

(a) Given that $\log_a 2 = 0.3869$, $\log_a 3 = 0.6131$ and $\log_a 5 = 0.8982$. Solve the following logarithmic function: $\log_{25} 24$.

(7 marks)

(b) Solve the simultaneous solution of the following system.

$$x + 2y + z = 8$$
$$2x + y - z = 1$$
$$x + y - 2z = -3$$

(6 marks)

(c) Sketch the graphical solution of the following system of inequalities.

$$x + y \leq 5$$
$$x - 3y < -3$$
$$x \geq 0$$

(5 marks)

(d) The length of a rectangular swimming pool is $5\ m$ longer than the double of its width. The area of the pool is $250\ m^2$. Find the dimension of the pool.

(4 marks)

(e) Solve the equation, $\sum_{n=1}^{4} 2\left(-\frac{1}{2}\right)^{n+1}$. (3 marks)

(Total: 25 marks)

Question 4

(a) Given the n^{th} term of an arithmetic progression is $2n + 3$. Find

(i) the 9th term, (2 marks)

(ii) the sum of the first 9 terms. (3 marks)

(b) The sum of the first three terms of a geometric progression is $-\frac{3}{2}$ and the sum to infinity is $-\frac{4}{3}$. Find

(i) the common ratio, (2 marks)

(ii) the 6th term. (3 marks)

(c) Compute the derivative of the following equation.

(i) $x^2 - 2xy^2 + y = 16x$ (6 marks)

(ii) $y = \frac{x-4}{x^2+5}$ (4 marks)

(d) Solve the following integral using substitution method.

$$\int 18x^2 \sqrt[4]{6x^3 + 5}\ dx$$

(5 marks)

(Total: 25 marks)

~The End~