FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**April 2022**
Programme	:	Diploma In Information Technology Programme (DITN**)** Diploma In Computer Science Programme (DCS**)**
Course	:	**MAT1103: Fundamentals of Mathematics**
Date of Examination	:	06 August 2022 (Saturday)
Time	:	08.00am-10.30am Reading Time : Nil
Duration	:	02 Hours 30 Minutes

Special Instructions :

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

Material permitted :

Non-Programmable Scientific Calculator

Materials provided :

Nil

Examiner(s)	**:**	**Mei Tuan Teng,** Mohd.Hafis
Chief 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: APRIL 2022 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) $\dfrac{(x^{-2}y^{7}z^{-5})^{2}}{(x^{-1}y^{3}z^{-2})^{-1}}$ (4 marks)

(ii) $\sqrt{24}+2\sqrt{54}-\sqrt{96}$ (3 marks)

(iii) $\dfrac{2\sqrt{7}}{\sqrt{7}-2}$ (3 marks)

(iv) $(\sqrt{3}+\sqrt{5})(\sqrt{2}-\sqrt{6})$ (2 marks)

(b) Solve the following inequalities.

(i) $-7 < 2-3x \leq -1$ (4 marks)

(ii) $4|x+2|-3 \leq 9$ (4 marks)

(c) Find the equation of the line that is perpendicular to the line $2x+3y-1=0$ 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,. $-x = \frac{1}{3}y - 1$ (3 marks)

(b) Let $f(x) = 3x^2 - 2$ and $g(x) = \frac{2x+3}{x-1}$. Find

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

(ii) $(f \bullet g)(2)$ (2 marks)

(iii) $g^{-1}(x)$ (3 marks)

(c) Use completing the square to find vertex and sketch the graph of the function $y = x^2 - 6x + 8$ with the x-intercept, y-intercept and vertex shown clearly. (7 marks)

(d) Solve the following logarithm equations for x.

(i) $\frac{1}{\log_9 x} = 2$ (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) Solve the following logarithmic equations for x. Give the answer up to four significant figures if necessary.

(i) $4^{x-1} = 5^x$ (4 marks)

(ii) $e^{2-x} = 11$ (3 marks)

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

$$\begin{aligned} x + y - z &= 0 \\ 2x - 3y + 4z &= 4 \\ 3x - 2y + z &= 6 \end{aligned}$$

(6 marks)

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

$$\begin{aligned} x + y &\leq 5 \\ x - y &\leq 2 \\ x - 1 &> 0 \end{aligned}$$

(5 marks)

(d) The side of a width of a rectangle is 3cm shorter than the length. Find the dimension of the rectangle if its area is 10cm^2.

(4 marks)

(e) Solve the equation $\sum_{2}^{5}(3x+1)^2$ (3 marks)

(Total: 25 marks)

Question 4

(a) The nth term of an arithmetic progression is given by $33n - 18$. Find

(i) the 1st term, (1 marks)

(ii) the common difference, (2 marks)

(iii) the sum of the first 7 terms. (2 marks)

(b) Based on the following geometric progression, find the 8th term and the sum of the first 8 terms.

$$1, 1.1, 1.21, \ldots$$

(5 marks)

(c) Solve $\frac{dy}{dx}$ for each of the following.

(i) $y^3 + xy = 2x^2$ (5 marks)

(ii) $y = (x^3 + 3x)^4$ (3 marks)

(d) Solve the following integration using substitution method: $\int 3\sqrt{5x + 3}\ dx$ (4 marks)

(e) Solve the following integration: $\int_2^3 3x^2 + 1\ dx$ (3 marks)

(Total: 25 marks)

~The End~

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