INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES'

FINAL
Examination Paper

(COVER PAGE)

Session	:	**August 2014**
Programme	:	Diploma In Information And Communication Technology (DICTN)
Course	:	**MAT1103 : Fundamentals Of Mathematics**
Date of Examination	:	December 10, 2014
Time	:	11:00am – 1:00pm Reading Time:
Duration	:	2 Hours
Special Instructions	:	

Answer any **FOUR (4)** structured-type questions.

Materials permitted : Non-Programmable Calculator

Materials provided : Nil

Examiner (s) : **Mr. Aung Min,** Adele Kam Hwei Ting .

Moderator : Dr. Ng Set Foong

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

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY PROGRAMME (DICTN)
MAT 1103: FUNDAMENTALS OF MATHEMATICS
FINAL EXAMINATION: AUGUST 2014 SESSION

Instructions: This question paper consists of **SIX (6)** questions.Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) Simplify the following expressions. Leave your answer without using negative exponents.

(i) $\left(\frac{6m^{-2}n^3}{15m^{-1}n^{-2}}\right)^2$ (3 marks)

(ii) $\frac{\left(-2a^2b^{-3}\right)^2}{2a^5b^{-1}}$ (3 marks)

(b) Factorize completely each of the following polynomials.

(i) $3ac + bd - 3ad - bc$ (3 marks)

(ii) $x^2 - y^2 - 4y - 4$ (3 marks)

(c) Simplify the expressions completely. Assume that all variables represent positive variables.

(i) $\frac{x^2+5x+6}{x^2-4} \times \frac{x-2}{x+3}$ (3 marks)

(ii) $\frac{3x^2+7x+2}{x^2+2x} \div \frac{3x^2+x}{x^2+x}$ (4 marks)

(d) Rationalize the denominator of the following expressions.

(i) $\frac{9}{\sqrt{3x}}$ (3 marks)

(ii) $\frac{\sqrt{x}+2}{2\sqrt{x}+3}$ (3 marks)

Question 2

(a) Solve the following equations for x.

(i) $|x + 4| = 3x - 8$ (4 marks)

(ii) $\sqrt{2x + 3} - \sqrt{x - 2} = 2$ (5 marks)

(b) Solve the following inequalities.

(i) $30 \leq \frac{5}{9}(x-32) \leq 35$ (4marks)

(ii) $\frac{|x+3|}{6} > \frac{2x-4}{3}$ (4 marks)

(iii) $|3(x - 2)| + 4 \leq 10$ (4 marks)

(c) If one side of a triangle is one-third the perimeter, the second side is 7 meters, and the third side is one-fifth the perimeter, what is the perimeter of the triangle? (4 marks)

Question 3

(a) Sketch the graph of $f(x) = 2x^2 - 4x + 3$ by showing its vertex, x and y intercepts, where applicable, clearly. (8 marks)

(b) Given that $f(x) = \frac{3}{x-1}$ where $x \neq 1$ and $g(x) = \frac{1}{x^2}$, find the followings:

(i) $(f + g)(4)$ (2 marks)

(ii) $(f.g)(4)$ (2 marks)

(iii) $(f \circ g)(x)$ (4 marks)

(iv) $f^{-1}(x)$ (4 marks)

(c) Perform $f(x) = x^3 - 7x + 8 \div (x - 2)$ using long division and represent the answer in the form of $quotient + \frac{remainder}{divisor}$. (5 marks)

Question 4

(a) Find the distance, midpoint and the equation of the straight line that passes through the two points (3, 6) and (0, 8). (7 marks)

(b) Solve the following system of equations:

$$x + y + 2z = 1$$
$$3x + 2y - z = 9$$
$$2x - y + z = 2$$

(6 marks)

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

$$x + y \geq 1$$
$$x - y \leq 0$$
$$y \leq 5$$

(7 marks)

(d) Find the dimensions of a rectangle if its area is 96 cm^2 and its perimeter is 40 cm. (5 marks)

Question 5

(a) Solve the following equations. Give the answer up to 4 significant figures where necessary.

(i) $23^x = 3$ (3 marks)

(ii) $2\log_2 x = 3 + \log_2(x - 2)$ (5 marks)

(iii) $e^{2-x} = 45$ (2 marks)

(iv) $\ln(2x + 5) - ln3 = \ln(x - 1)$ (4 marks)

(v) $4^{x+2} = \frac{1}{128^{x-1}}$ (4 marks)

(b) Given that $\log_b 3 = 0.8$, determine the value of $\log_b \frac{b}{\sqrt{3}}$. (4 marks)

(c) By using the Factor Theorem, show that $(x + 1)$ is a factor of

$f(x) = x^3 - 7x^2 + 7x + 15$. (3 marks)

Question 6

(a) Find the 8th term in the expansion of $(3x-2)^9$ in descending powers of x. (4 marks)

(b) Expand $(2x-5y)^4$ in descending powers of x. (6 marks)

(c) If 3, x, y, z, 35 are in an arithmetic sequence, find the values of x, y, z. (4 marks)

(d) The fourth and seventh term of a geometric progression is $-\frac{3}{8}$ and $\frac{3}{64}$ respectively. Find the common ratio r and S_{10}. (5 marks)

(e) A high rise building has 40 floors. A cleaning company charges RM 80 to clean the first floor and additional RM 40 for each floor above the previous floor. Determine:

(i) the cleaning cost for the 25^{th} floor, (3 marks)

(ii) the total cleaning cost for the whole building. (3 marks)

-The End -

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