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INTERNATIONAL COLLEGE PENANG (507232-U)
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session : January 2017

Programme : FOUNDATION IN SCIENCE (CFSI)

Course : MAT1210 : MATHEMATICS 1

Date of Examination : 7 March 2017 (Tuesday)

Time : 11:00am – 1:00pm Reading Time : Nil

Duration : 2 Hours

Special Instructions :

This paper consists of FIVE (5) questions. Answer any FOUR (4) questions in the answer booklet Provided. All questions carry equal marks.

Materials permitted :

Non-Programmable Calculator

Materials provided :

Mathematics Formulae booklet 1, Graph paper, Answer booklet

Examiner(s) :

Ms. Fang Yen Yen

Moderator :

Dr. Ch'ng Pei Eng

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

INTI INTERNATIONAL COLLEGE PENANG
 FOUNDATION IN SCIENCE (CFSI)
MAT1210: MATHEMATICS 1
 FINAL EXAMINATION: JANUARY 2017 SESSION

Instructions: This paper consists of **FIVE (5)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

- (a) Write each expression below in the simplest form and rewrite using only positive exponents.

(i) $\frac{xx^{-\frac{1}{3}}}{2x^5}$ (4 marks)

(ii) ${}^3\sqrt{\frac{m^{-1}n^{-10}}{m^{-7}n^{-3}}}$ (4 marks)

(iii) $\left(\frac{r^{-3}}{q^{-5}r}\right)^0 \left(\frac{p^{-1}q^{-1}r^{-3}}{p^{-7}q^{-5}r}\right)^{-\frac{1}{2}}$ (5 marks)

- (b) Solve for x .

(i) $\sqrt{2-x} = 1-2x$ (6 marks)

(ii) $x - xe^{5x+2} = 0$ (6 marks)

Question 2

- (a) Find the gradient and y-intercept for the equation, $\frac{x}{4} = -3y + 10$. (4 marks)
- (b) Simplify: $\sqrt{32} + \sqrt{200} + \sqrt{2}$ (3 marks)
- (c) Let $f(x) = x^2 - 1$ and $g(x) = 2 - x$, Find
- (i) $(f + g)(x)$ (1 mark)
- (ii) $g(x) - f(x)$ (1 mark)
- (iii) $(f \square g)(x)$ (2 marks)
- (iv) $(g \circ f)(2)$ (3 marks)
- (d) Simplify $\frac{1}{\sqrt{5}-1}$. (4 marks)
- (e) Given a polynomial $P(x) = x^3 + 2x^2 - x + 7$.
- (i) Show that $(x+3)$ is not a factor of $P(x)$. (2 marks)
- (ii) Use long division method to find the quotient and remainder when $P(x)$ is divided by $(x-1)$. (5 marks)

Question 3

- (a) Use the binomial theorem to expand $(2a + b)^5$. (5 marks)
- (b) Simplify each of the following logarithms.
- (i) $\ln x^3 y^4 z^5$ (2 marks)
- (ii) $\log_3 \left(\frac{9x^4}{\sqrt{y}} \right)$ (4 marks)
- (c) Solve the following:
- (i) $4 \log(1 - 5x) = 2$ (5 marks)
- (ii) $\log x + \log(x - 3) = 1$
- (d) Find the derivative of $y = 2x + \sqrt{6x}$. (3 marks)

Question 4

- (a) Write the equation of the line that is perpendicular to the line $y = 4x + 3$ and which passes through the origin. (5 marks)
- (b) Solve the following equations:
- (i) $\tan 2x = -1.264$ for $0^\circ \leq x \leq 360^\circ$ (6 marks)
- (ii) $2 \cos^2 \theta - 3 \cos \theta + 1$ for $0^\circ \leq \theta \leq 360^\circ$ (6 marks)
- (c) Find the area enclosed by the curve $y = 3x(x - 2)$ and the x-axis between $x = 0$ and $x = 3$. (8 marks)

Question 5

- (a) Sketch the graph of $y = -\frac{2}{5}x + 3$ by showing its y-intercept and x-intercept points.
And thus, find the shortest distance between the y-intercept and x-intercept points. (5 marks)

(b) Simplify:

(i) $\frac{x\sqrt{x}}{(3x-4)^{-2}}$ (4 marks)

(ii) $\sqrt[3]{(2x^2)^3}$ (2 marks)

- (c) Figure 1 shows a triangle ABC, where $AB = 9.7\text{m}$, $AC = y\text{m}$, and the angle $ACB = 41^\circ 15'$. Find the value of y , correct to 3 significant figures. (4 marks)

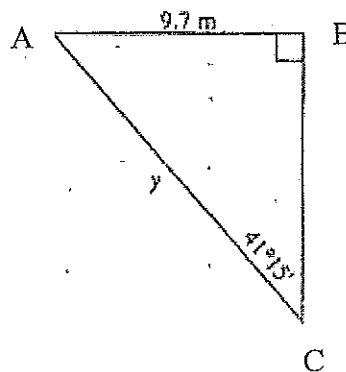


Figure 1

- (d) Differentiate each of the following with respect to x :

(i) $h(x) = \frac{2x+5}{3x-4}$ (5 marks)

(ii) $y = x\sqrt{x+1}$ (5 marks)

~ The End ~