UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017

COURSE NAME	:	MATHEMATICS II
COURSE CODE	:	BBM 10403
PROGRAMME CODE	:	BBA/ BBB/ BBD/ BBG
EXAMINATION DATE	:	JUNE 2017
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWERS **ALL** QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

S1   (a)   Given function, $f(x) = \begin{cases} 2x+15; x < -6 \\ -\dfrac{1}{3}x+1; -6 \le x \le 6 \\ \dfrac{1}{2}x-4; x > 6 \end{cases}$

         (i)   Sketch the graph of $f(x)$.

(6 marks)

         (ii)   Determine the domain and range of $f(x)$.

(2 marks)

   (b)   Based on the graph S1(a), find the limits of $f(x)$ at:

         (i) $x = -6$

(3 marks)

         (ii) $x = 6$

(3 marks)

         (iii)   Evaluate $f(x)$ continuous or discontinuous.

(3 marks)

   (c)   Given $f(x) = x^2 - 2x + 3$ and $g(x) = 2x - 1$. Show that $f \circ g \ne g \circ f$.

(3 marks)

S2   (a)   Find the inverse of $f(x) = (x-2)^3$.

(3 marks)

   (b)   Find the limits of the following functions:

         (i) $\lim\limits_{x \to 1} \dfrac{e^{2x} + e^x}{e^x - 1}$

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(2 marks)

         (ii) $\lim\limits_{x \to 5} (x^3 + 3x^2 - 7x + 1)$

(3 marks)

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(iii) $\lim\limits_{x \to 2} \dfrac{x^2 - 3x + 2}{x^2 - 4}$

(4 marks)

(iv) $\lim\limits_{x \to 0} \dfrac{2x}{\sqrt{2x^2 + x + 1} - \sqrt{x^2 - 3x + 1}}$

(4 marks)

(v) $\lim\limits_{x \to \infty} \dfrac{x^2 - 3x + 7}{x^3 + 10x - 4}$

(4 marks)

S3 (a) Find $\dfrac{dy}{dx}$ for:

i) $y = (8x + 5)^4 (x^3 + 3)^{12}$

(2 marks)

ii) $y = \dfrac{(3x + 1)^5}{(2 - x)^8}$

(3 marks)

(b) By using chain rule, compute:

i) $y = e^{3x^2}$

(3 marks)

ii) $y = \sqrt{2x^2 + 1}$

(3 marks)

(c) Find the second and third derivatives for $y = \dfrac{-2x}{3x - 1}$.

(5 marks)

(d) Find $\lim\limits_{x \to 0} \dfrac{\frac{1}{x}}{\ln x}$ by using L'Hopital's Rules .

(4 marks)

S4 (a) Find $\int 5\sqrt{x}\,dx$.

(3 marks)

(b) By using part by part techniques, find $\int x^2 \sin 2x\,dx$.

(7 marks)

(c) Evaluate $\int \frac{1}{(x-1)^2(x+1)}\,dx$ using partial fraction.

(5 marks)

(d) Find the area of the region bounded by the curve $y = x^3$, the lines $y = 1, y = 8$ and the y-axis.

(5 marks)

S5 (a) The third term of an arithmetic sequence is 10 and the sixth term is 22 respectively,

i) find the common difference and the first term.

(4 marks)

ii) calculate the 10th.

(2 marks)

(b) Find the least number of terms required so that the arithmetic series $20+25+30+ \ldots$ give a sum that exceed 500.

(8 marks)

(c) Ali borrows from Ahmad RM720. At the end of the first month he pays RM20. For the following months he pays RM15 more than the previous month. Find the amount of the last payment he makes.

(6 marks)

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-END OF QUESTIONS-