UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

COURSE NAME	:	MATHEMATICS II
COURSE CODE	:	BBM 10403
CODE PROGRAMME	:	BBA/BBB/BBF
EXAMINATION DATE	:	JUNE/JULY 2016
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWERS ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

S1 (a) Given function, $f(x)=\begin{cases}2-x^2, & x\le 0\\ x+4, & 2\le x\le 6\\ 3x, & x>6\end{cases}$

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

(4 marks)

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

(2 marks)

(b) Based on the figure S1(b), state the equation of *f(x)* and determine the domain and range of *f(x)*.

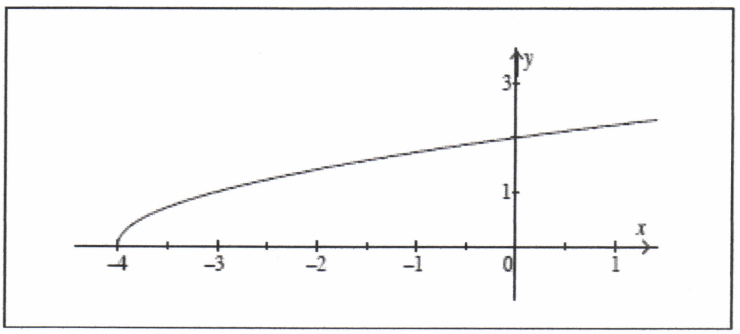

Figure S1(b)

(4 marks)

(c) Given $f(x)=\dfrac{3-x}{2}$, $g(x)=ax^2+bx+2$ and $h(x) = 2x-1$. If $gf^{-1}=16x^2-58x+53$

(i) Calculate the value of *a* and *b*.

(5 marks)

(ii) Determine the composite function of *fg(-1)*.

(3 marks)

(iii) Compute $f\circ h$.

(2 marks)

S2 (a) Find the limits of the following functions:

(i) $\lim_{x\to 1}\dfrac{2x^2+x-3}{1-x}$

(2 marks)

(ii) $\lim_{x\to 2}\dfrac{x^2-5x+6}{2x^2-3x-2}$

(4 marks)

(iii) $\lim_{x\to 4}\dfrac{x^2-16}{\sqrt{x^2+9}-5}$

(4 marks)

(iv) $\lim_{x\to \infty}\dfrac{2x-1}{\sqrt{x^2-9}}$

(4 marks)

(b) Given function, $f(x)=\begin{cases}\dfrac{1}{x+1}, & x<-1\\ x^2-3, & -1\le x\le 3,\\ 6, & x>3\end{cases}$

Determine whether *f(x)* is continuous at $x=3$ and $x=1$

(6 marks)

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

(i) $y=\dfrac{2x^2-3}{2x+3}$

(4 marks)

(ii) $y=\ln(x+\ln x)$

(4 marks)

(b) Given that $y=\dfrac{x^2}{4-x}$, find $\dfrac{dy}{dx}$ and $\dfrac{d^2y}{dx^2}$ in terms of x.

(6 marks)

(c) A cylindrical container has one end opened and the other end closed. It has a circular base of radius r cm. Given that the volume of container is $V = 150\pi r - \frac{\pi r^3}{2} cm^3$.

(6 marks)

S4 (a) Find:

(i) $\int (\frac{2x^5 - 3}{x^2}) dx$

(3 marks)

(ii) $\int_2^5 3f(x)$ when $f(x) = 5$

(2 marks)

(b) Solve $\int \frac{\ln x}{x^2} dx$ using integration by part.

(8 marks)

(c) Question S4 (c) is based on figure S4 (c).

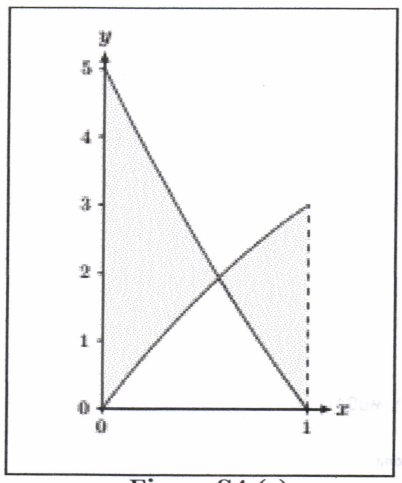

Figure S4 (c)

Find the area between $f(x) = -x^2 + 4x$ and $g(x) = x^2 - 6x + 5$ over the interval $0 \le x \le 1$.

(7 marks)

S5 (a) Expand the following sequences:

(i) $\sum_{k=1}^{4} k^2 - 2k + 7$

(3 marks)

(ii) $\sum_{k=1}^{5} 5k$

(3 marks)

(b) The first term of a finite geometric series is 6 and the last term is 4374. The sum of all terms is 6558. Find the number of terms r.

(8 marks)

(c) The value of a certain type of vehicle when it is new is RM4500 and it depreciates by 10% each year. Find the value of this vehicle when it is five years old.

(6 marks)

-END OF QUESTIONS-