Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2017/2018

COURSE NAME	:	MATHEMATICS II
COURSE CODE	:	BBM 10403
PROGRAMME CODE	:	BBA/ BBB/ BBD/ BBG
EXAMINATION DATE	:	DECEMBER 2017/ JANUARY 2018
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWERS **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

S1 (a) Given function, $f(x)=\begin{cases}0; x<-2\\ -x^2+4; -2\le x\le 1\\ -x+3; x>2\end{cases}$

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

(4 marks)

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

(2 marks)

(b) Based on the graph S1(a)

(i) Find the limits of $f(x)$ at $x=-2$

(3 marks)

(ii) Evaluate $f(x)$ continuous or discontinuous

(3 marks)

(c) Given $f(x)=\frac{3-x}{2}$, $g(x)=ax^2+bx+2$ and $h(x) = 2x-1$. If $gf^{-1}=16x^2-58x+50$

(i) Calculate the value of a and b

(5 marks)

(ii) Determine $f\circ g$

(3 marks)

S2 (a) Find the following limit

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

(2 marks)

(ii) $\lim_{x\to 0}\dfrac{e^{2x}+e^{x}-2}{e^{x}-1}$

(2 marks)

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

(4 marks)

(iv) $\lim_{x\to \infty}\dfrac{x^2-3x+7}{x^3+10x-4}$

(4 marks)

(b) Given function, $f(x)=\begin{cases} x+2a, x<-2 \\ 3ax+c, -2\le x\le 1 \\ 3x-2c, x>1 \end{cases}$, determine a and c if $f(x)$ is continuous

(8 marks)

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

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

(2 marks)

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

(3 marks)

(b)

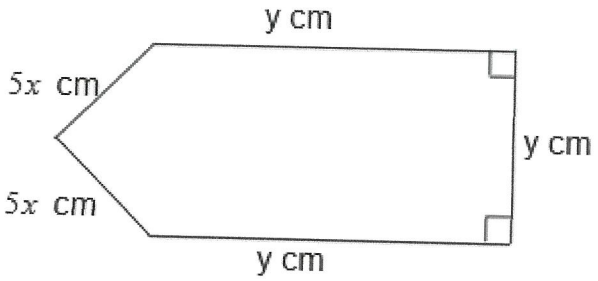

Diagram 1

A piece of wire of length 120 cm is bent into a shape as shown in the Diagram 1

(i) Express y in term of x

(2 marks)

(ii) Hence, shows that the area, A cm^2 , is given by $A = 36x(10\text{-}x)$

(2 marks)

(iii) Find the value of x and y for which **A** is maximum and state its maximum value

(2 marks)

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

(5 marks)

(d) Find $\lim_{x\to 0}\frac{\frac{1}{x}}{\ln x}$ 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)

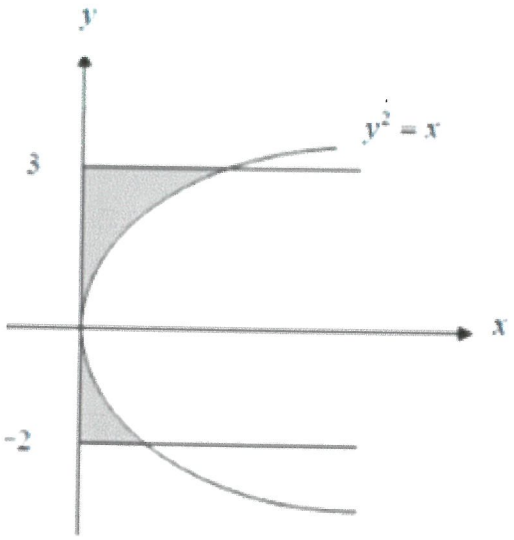

Diagram 2

Diagram 2 shows a curve $y^2 = x$, straight lines $y = 3$ and $y = -2$. Find the area of the shaded region

(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

(3 marks)

(ii) calculate the 12^{th}

(2 marks)

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

(8 marks)

(c) Ahmad borrows from Ali RM620. For the following months he pays RM15 more than the previous month. At the end of the first month he pays RM20. Find the amount of the last payment he makes.

(6 marks)

-END OF QUESTIONS-