INTI International University & Colleges

FINAL

Examination Paper

(COVER PAGE)

Session	:	**APRIL 2019**
Programme	:	Diploma in Business (DIB)
Course	:	**MAT1106: Business Mathematics**
Date of Examination	:	1 August 2019, (Thursday)
Time	:	5:00pm – 7:00pm Reading Time : Nil
Duration	:	2 Hours

Special Instructions :

This paper consists of **SIX (6)** questions.

Answer any **FIVE (5)** questions in the answer booklet provided.

Materials permitted :

Non-Programmable Calculator

Materials provided :

Formula sheet, Graph paper

Examiner(s) : **Dinesh Kumar,** Billy Siew Woo Bing, and Goh Chok Huat

Moderator : Dr Ch'ng Pei Eng

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

DIPLOMA IN BUSINESS (DIB)
MAT1106 BUSINESS MATHEMATICS
FINAL EXAMINATION: APRIL 2019 SESSION

Instructions: This paper consists of **SIX (6)** structured-type questions. Answer **FIVE (5)** out of SIX structured-type the questions in the answer booklet provided. All questions carry equal marks of 20 marks.

Question 1

(a) Simplify the following:

(i) $2\left(2\sqrt{32}-\sqrt{72}\right)$ (3 marks)

(ii) $\dfrac{2\,x^6\,y^7}{6\,x^4\,y^3}$ (2 marks)

(b) Expand: $(x-2)(x+2)+(2x^2-x+6)$ (2 marks)

(c) Factorize the expressions completely: x^2-36 (2 marks)

(d) Simplify:

$$\frac{2x}{x+3}+\frac{x}{x-9}$$

(3 marks)

(e) Solve the quadratic equation by using ***formula***: $2x^2-14x-13=0$ (4 marks)

(f) Solve the following equation for x:

$$(x-3)(x+1)+2(3x-2)=(x-1)^2$$

(4 marks)

Question 2

(a) Given that $f(x)=2x^2-x$ and $g(x)=x-5$, find

(i) $f(3)-g(-2)$ (3 marks)

(ii) the value(s) of x if: $f(2)-g(3)=g(x)$ (3 marks)

(b) Write the equation of a line that passes through the point $(2,-6)$ and $(3,-4)$. (5 marks)

(c) Given $f(x)=-x^2+4x+5$, sketch the graph of $f(x)$ by indicating the *vertex point*, $y-intercept$ and $x-intercept$ clearly. (7 marks)

(d) Solve for x:

$$\frac{x+6}{3} \leq 5$$

(2 marks)

Question 3

(a) Differentiate the following with respect to x :

(i) $y = 2x^4 - x^3 + 3x^2 + x - 1$ (2 marks)

(ii) $y = (3x^2 - 2x)^5$ (3 marks)

(b) The revenue function in ringgit of a product is given as:

$$R(x) = 45{,}000x - 50x^2$$

where x is units of products sold.

(i) Determine the production level that earns the company maximum revenue and find the company's maximum revenue. (5 marks)

(ii) How much should each product be sold to achieve maximum revenue? (2 marks)

(c) Evaluate the integral:

$$\int_1^3 (8x^3 + 9x^2 - 30x)dx$$

(5 marks)

(d) Solve for x:

$$\frac{x^2 - 49}{3} = 5$$

(3 marks)

Question 4

(a) RM 10,000 is invested for 7 years in a bank, earning a simple interest rate of 5.3% per annum. Find the simple amount at the end of the investment period and the interest earned. (3 marks)

(b) Find the accumulated amount of RM 40,000 which is invested for 8 years at 4.1% compounded monthly. (3 marks)

(c) Find the future value of annuities for RM 300, invested every month for 10 years at 5.4% compounded monthly. (3 marks)

(d) Find the present value of annuities of RM 1,000 monthly for 6 years at 4.3% compounded annually. (3 marks)

(e) Find the amount that must be deposited monthly at 4% compounded monthly for 10 years to accumulate an amount of RM 80,000. (3 marks)

(f) Find the equation of the line that passes through the point$(3, 5)$, and it is parallel to the line $3y + 6x - 9 = 0$. (5 marks)

Question 5

(a) Given matrix $A = \begin{bmatrix} -1 & 3 \\ 1 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix}$.

(i) Find $2A + 3B$. (3 marks)

(ii) Find $3(AB) - A$. (4 marks)

(iii) Find B^{-1}. (3 marks)

(b) Solve the system of equations by using *any matrices method*:

$$\begin{aligned} 3x + 2y &= 6 \\ 5x + 3y &= 11 \end{aligned}$$

(4 marks)

(c) Given the first four terms of an arithmetic sequence are: $10, 8, 6, 4$ ...

(i) Find the 8^{th} term of the sequence. (3 marks)

(ii) Find the sum of the first 10 terms of the sequence. (3 marks)

Question 6

(a) If $P = x - y$, find the **maximum** value of P subject to the given constraints:

$$\begin{aligned} y &\leq -x + 8 \\ 0 \leq y &\leq 5 \\ 0 \leq x &\leq 3 \end{aligned}$$

(7 marks)

(b) The table below shows the sales of product over the last 7 years.

Year	2000	2001	2002	2003	2004	2005	2006
Sales in (RM Millions)	52	55	54	57	56	57	58

Use a five-years moving average of the sales to forecast for year 2006 and find the forecast error for year 2006. (4 marks)

(c) Solve for x:

$$\frac{x}{x-3}+\frac{4}{2}=1$$

(4 marks)

(d) Given the first three terms of a geometric sequence are: $7, 14, 28, \ldots$

i. Find the 5^{th} term of the sequence. (3 marks)
ii. Find the sum of the first 7 terms of the sequence (2 marks)

~THE END~

MAT1106(Final)April2019/formatted