INTI International College Penang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session : **April 2017**

Programme : Foundation In Business Information Technology (CFPI)

Course : **MAT1215: Fundamentals of Mathematics**

Date of Examination : 31 July 2017 (Monday)

Time : 2:00pm – 4:00pm 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. All questions carry equal marks.

Materials permitted :

Non-Programmable Scientific Calculator

Materials provided :

Formula Booklet 1, Graph Paper

Examiner(s) : **Ng Ci Xiang**

Moderator : Dr. Ch'ng Pei Eng

This paper consists of 7 printed pages, including the cover page.

INTI INTERNATIONAL COLLEGE PENANG

FOUNDATION IN BUSINESS INFORMATION TECHNOLOGY (CFPI)
MAT1215: FUNDAMENTALS OF MATHEMATICS
FINAL EXAMINATION: APRIL 2017 SESSION

Instruction: This paper consists of **SIX (6)** questions. Answer any **FIVE (5)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) Simplify each of the following expressions:

(i) $\left(18x^3-2x^2-7x+8\right)-\left(9x^3-6x^2-5x+7\right)$ (2 marks)

(ii) $3\sqrt{125}-2\sqrt{80}-9\sqrt{5}$ (2 marks)

(b) Factor each expression.

(i) $2x^2-50$ (3 marks)

(ii) $x^3-12-3x^2+4x$ (3 marks)

(c) Rationalize the denominator of $\dfrac{4\sqrt{15}+5\sqrt{12}}{2\sqrt{3}}$. (3 marks)

(d) Simplify $\left(\dfrac{2x^{-2}y}{x^4y^{-1}}\right)^{-2}$ and express your answer in positive exponent only. (3 marks)

(e) Simplify $\dfrac{640000\times 0.0000825}{120^2}$ and write your answer in scientific notation. (4 marks)

Question 2

(a) Line J passes through the points $(-5,-2)$ and $(5,4)$. Line K passes through the point $(-3,6)$ and is perpendicular to line J.

(i) Find the gradient of line J. (2 marks)

(ii) Find the gradient of line K. (2 marks)

(iii) Find the equation for line K. (3 marks)

(b) Given $f(x)=6-4x+x^2$.

(i) Find the vertex of the graph $f(x)$. (2 marks)

(ii) Find the x and y-intercepts. Hence sketch the graph of $f(x)$. (5 marks)

(c) The revenue and cost functions for a company manufactures DVD players were determine to be:

$$R(x)=80x \text{ and } C(x)=20x+30000$$

where x is the number of DVD players and $R(x)$ and $C(x)$ are in RM.

(i) How many DVD players must be sold in order for the company to breakeven? (3 marks)

(ii) Find the profit equation. (2 marks)

(iii) What is the profit if 10000 DVD players are sold? (1 mark)

Question 3

(a) Differentiate the following with respect to x:

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

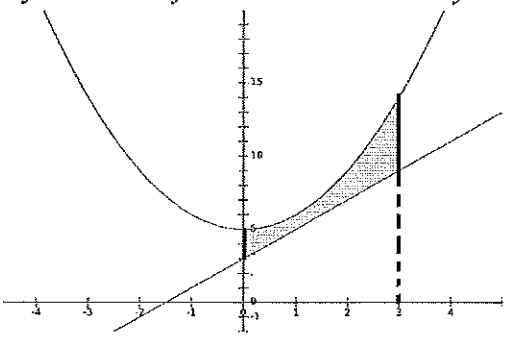
(ii) $y=5+3\sqrt{x}$ (3 marks)

(b) Integrate the following with respect to x:

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

(ii) $\int_{-2}^{2}(-x^2+4)dx$ (3 marks)

(c) Find the area enclosed by the curve $y=x^2+5$ and the line $y=2x+3$ from $x=0$ to $x=3$.



(4 marks)

(d) Evaluate the followings:

(i) $\sum_{i=5}^{12} 7i$ (2 marks)

(ii) $\sum_{k=1}^{5}(k-3)(k+2)$ (2 marks)

Question 4

(a) If the inflation rate averages 4% per year compounded annually for the next 5 years, what will a car that costs RM17,000 now cost 5 years from now? (3 marks)

(b) Tom has a list of rate and compounding period for certificates of deposit (CDs) recently offered by two banks:

Republic Bank: 4.31% compounded continuously.
Chase Bank: 4.35% compounded monthly.

Calculate the annual percentage yield for both banks, and decide which of these CDs has the best return.

(5 marks)

(c) If you buy a computer directly from the manufacturer for RM2500 and agree to repay it in 48 equal installments at 1.25% interest per month on the unpaid balance.

(i) How much are your monthly payments? (3 marks)

(ii) How much is the total interest paid? (3 marks)

(d) Guaranty Income Life offered an annuity that pays 6.65% annual rate that compounded monthly. If RM500 is deposited into this annuity every month for 10 years, find

(i) the accumulated amount at the end of the investment period. (3 marks)

(ii) the total interest earned. (3 marks)

Question 5

(a) Find the first term and common difference of an arithmetic progression in which $T_{15} = 11$ and $T_{35} = 41$. (4 marks)

(b) Perform the indicated operations below:

(i) $\begin{bmatrix} 2 & -1 \\ 3 & 0 \end{bmatrix} - \begin{bmatrix} -3 & 1 \\ 2 & -3 \end{bmatrix}$ (2 marks)

(ii) $\begin{bmatrix} -3 & 2 \\ 4 & -1 \end{bmatrix} \bullet \begin{bmatrix} -2 & 5 \\ -1 & 3 \end{bmatrix}$ (3 marks)

(c) Find the inverse of matrix $\begin{bmatrix} 2 & 2 \\ 2 & 3 \end{bmatrix}$. (3 marks)

(d) The system of equations below can be expressed in the form $AX = B$.

$$\begin{cases} x - y = 4 \\ 3x + 7y = -18 \end{cases}$$

(i) List down the matrices A, X and B. (3 marks)

(ii) Find the values of x and y by using matrices. (5 marks)

Question 6

(a) Solve the following linear programming problem graphically.

Maximize: $P = 30x + 40y$
Subject to: $2x + y \leq 10$
$x + y \leq 7$
$x + 2y \leq 12$
$x \geq 0$
$y \geq 0$ (6 marks)

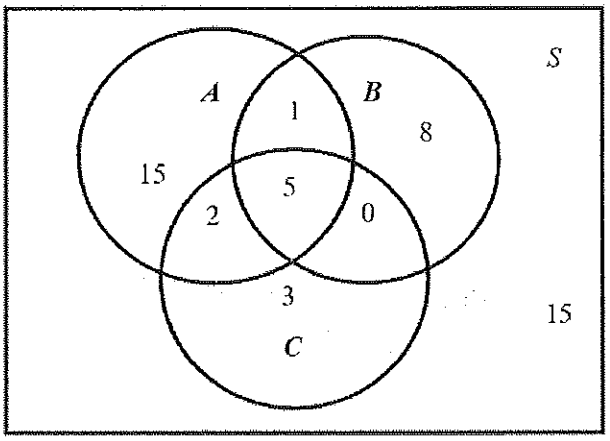
(b) A committee of parent-teacher association is made up of 6 people chosen from 7 parents, 4 teachers and a principal. In how many ways can the committee be form if it

(i) contains the principal? (2 marks)

(ii) contains exactly 3 parents? (2 marks)

(iii) must not have more than 3 parents? (4 marks)

(c) For a given Venn Diagram below, find:



(i) $n(A \cap B)$ (1 mark)

(ii) $n(A \cup C')$ (3 marks)

(iii) $n\left[(A \cup B)' \cap C\right]$ (2 marks)

~ The End ~