



**KOLEJ UNIVERSITI TEKNOLOGI
TUN HUSSEIN ONN**

**PEPERIKSAAN AKHIR
SEMESTER I
SESI 2006/2007**

NAMA MATA PELAJARAN : MATEMATIK PENGURUSAN

KOD MATA PELAJARAN : BSM 1813

KURSUS : 1BPA/ 1BPB/ 1BPC

TARIKH PEPERIKSAAN : NOVEMBER 2006

JANGKA MASA : 3 JAM

ARAHAN : JAWAB **SEMUA** SOALAN DALAM
BAHAGIAN **A** DAN **TIGA (3)**
SOALAN DALAM BAHAGIAN **B**

KERTAS SOALAN INI MENGANDUNGI 5 MUKA SURAT

PART A

Q1 (a) Find $\frac{dy}{dx}$ for

(i) $y = \frac{x+1}{x^2}$ at $x=1$,

(ii) $y = (x^3 e^x)^4$,

(iii) $y = (x^3 + x - 1)^5$.

(12 marks)

(b) Given $y = \ln(2x + 3)$.

Find

(i) $\frac{dy}{dx}$,

(ii) $\frac{d^2y}{dx^2}$.

(8 marks)

Q2 (a) Given $F(x) = \int (15x^2 + 6x + 10) dx$, find $F(x)$ if $F(0) = 6$.

(4 marks)

(b) Find

(i) $\int y\sqrt{y-1} dy$.

(ii) $\int_0^1 \int_2^3 (x+y) dy dx$.

(10 marks)

- (c) A company knows from past experience that its marginal revenue is given by the function

$$MR(n) = 562 - 0.2n$$

where n is the number of items offered for sale and $MR(n)$ is in units of Ringgit Malaysia (RM) per item. What is the total revenue, R for the production of 1200 items?

$$\left[\text{Hint : } MR(n) = \frac{dR}{dn} \right]$$

(6 marks)

PART B

- Q3 (a) Assuming $x > 0$, solve for x if $\frac{1}{x} - \frac{1}{5} < 3$.

(4 marks)

- (b) Translate into symbolic form and by the truth table, test the validity of this argument.

If I do not paint the house, I will go bowling.
I will not go bowling.

Therefore, I will paint the house.

(11 marks)

- (c) By using a truth table show that,

$$\sim p \wedge \sim q \equiv \sim(p \vee q)$$

(5 marks)

- Q4 (a) Let $A = \begin{pmatrix} 1 & 2 \\ 0 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 2 & 3 \\ -1 & 4 & -2 \end{pmatrix}$.

(i) Find A^2 .

(ii) Find $A^T B$.

(iii) Use the elementary row operations to find the inverse of matrix A.

(10 marks)

- (b) Given the system of linear equation,

$$\begin{aligned}2x - 4y + 2z &= 6 \\4x - 6y + 2z &= 0 \\-2x + 4y - 3z &= 1\end{aligned}$$

- (i) Write the system in a matrix form, $AX = B$.
- (ii) Write the augmented matrix, $(A|B)$.
- (iii) By performing row operations, solve the system of linear equations by using Gauss method.
- (10 marks)

- Q5** (a) On a mathematics test there are 10 multiple-choice questions with 4 possible answers and 15 true-false questions. In how many possible ways can a student give his answer if

- (i) he has to do all 25 questions?
- (ii) he can choose to do either all the multiple-choice questions or all the true-false questions?
- (8 marks)

- (b) In how many ways can we select a president, a vice-president and a secretary from a group of 10 persons?
- (3 marks)

- (c) A soccer team has 3 strikers, 6 midfielders, 9 defenders and 3 goalkeepers. How many different teams composed of 2 strikers, 3 midfielders, 5 defenders, and a goalkeeper can be formed?
- (5 marks)

- (d) In how many ways can 3 rambutan trees, 4 mangoes trees and 2 papaya trees be arranged along a fence line if one does not distinguish between trees of the same kind?
- (4 marks)

- Q6** (a) An investor has identified three attractive stocks and will divide RM10,000 among the three. The first stock is low-risk and return 4% per year, the second is medium-risk and return 6% per year, and the last is high-risk and return 9% per year. The investor's strategy requires that the amounts allocated to low- and medium-risk funds always exceed the amount invested in high-risk funds and that no more than RM4,000 be invested in high-risk funds. How much of each fund should the investor purchase to maximize total return?

(10 marks)

- (b) Given a minimum problem as below.

Minimize:

$$C = 3x_1 + 7x_2 + x_3$$

Subject to the constraints:

$$x_1 + x_3 \leq 6$$

$$2x_1 + x_2 \geq 4$$

$$x_1 \geq 0, \quad x_2 \geq 0, \quad x_3 \geq 0$$

- (i) Rewrite the constraints in the standard form.
 (ii) Find the dual maximum problem.
 (iii) Then, solve the linear programming problem.

(10 marks)