KOLEJ UNIVERSITI TEKNOLOGI TUN HUSSEIN ONN

PEPERIKSAAN AKHIR
SEMESTER I
SESI 2006/2007

NAMA MATA PELAJARAN : MATEMATIK PENGURUSAN

KOD MATA PELAJARAN : BSM 1812

KURSUS : 1BPD

TARIKH PEPERIKSAAN : NOVEMBER 2006

JANGKA MASA : 2 JAM 30 MINIT

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

KERTAS SOALAN INI MENGANDUNGI 4 MUKA SURAT

PART A

Q1 (a) Find $\frac{dy}{dx}$ for $y = \frac{x+1}{x^2}$.

(2 marks)

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

Find

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

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

(8 marks)

(c) Find

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

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

(10 marks)

PART B

Q2 (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)

Q3 (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,

$$2x - 4y + 2z = 6$$
$$4x - 6y + 2z = 0$$
$$-2x + 4y - 3z = 1$$

(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)

Q4 (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 gives his answer if

(i) he has to do all 25 questions?

(ii) he can choose 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)

Q5 (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:

$$x_1 \quad + x_3 \leq 6$$
$$2x_1 + x_2 \quad \geq 4$$
$$x_1 \geq 0, \quad x_2 \geq 0 \quad x_3 \geq 0$$

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

(10 marks)