



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION SEMESTER 1 SESSION 2009/2010

SUBJECT : MATHEMATICS FOR MANAGEMENT

CODE : BSM 1813

COURSE : 1 BPA/ BPB/ BPC

DATE : NOVEMBER 2009

DURATION : 3 HOURS

**INSTRUCTION : ANSWER ALL QUESTIONS IN PART A
AND THREE (3) QUESTIONS IN PART B**

THIS EXAMINATION PAPER CONSISTS OF 5 PAGES

PART A

Q1 (a) Find $\frac{dy}{dx}$ of the following functions and simplify the answers.

(i) $y = \ln\left(\frac{1}{x}\right)$.

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

(11 marks)

(b) Given $y = \cos(3x^2 + 1)$. Find

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

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

(9 marks)

Q2 (a) Find the following integration.

(i) $\int \left[\frac{x^2 - 16}{x - 4} + 3e^{2x} \right] dx$.

(ii) $\int_{-x}^x (y^3 - 1)^2 dy$.

(iii) $\int_0^1 3x^4 e^{x^5+1} dx$.

(13 marks)

(b) Given functions

$$f(x) = 2x^2 \text{ and } g(x) = -(x-2)^2 + 4.$$

(i) Sketch the graphs and find the intersection points.

(ii) Calculate the area bounded by the two graphs.

(7 marks)

PART B

- Q3** (a) Given $-2 < x < 2$. If $y = \frac{x+2}{3}$, determine the range values of y .
(5 marks)

- (b) (i) Define $|3-x|$.
(ii) Show that the value of x that fulfills the following inequality does not exist.

$$\frac{2}{|3-x|} < 0.$$

(5 marks)

- (c) Determine the validity of the following argument.

Sofea will go home either by bus or by taxi.

If Sofea go home by taxi, Sofea will arrive home early.

Sofea arrived home late.

Therefore Sofea went home by bus.

(10 marks)

- Q4** (a) Given matrices as follow.

$$A = \begin{pmatrix} -3 & 5 \\ -2 & 4 \end{pmatrix}, B = \begin{pmatrix} 1/2 & -3 \\ 1 & 3/2 \end{pmatrix} \text{ and } C = \begin{pmatrix} 3 & 2 & 0 \\ 1 & 4 & -5 \\ 7 & -2 & 1 \end{pmatrix}.$$

- (i) Calculate $\frac{A^{-1} + BB^T}{|C|}$.
(ii) Show that $(AB)^T = B^T A^T$.

(16 marks)

PART B

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(b) Given the system of linear equation below.

$$\begin{aligned} -x_1 + 2x_2 + 4x_3 &= 1 \\ 3x_1 + x_2 &= 3 \\ -2x_1 + 3x_2 + 6x_3 &= 2 \end{aligned}$$

Solve the system using appropriate method if

$$\begin{bmatrix} -1 & 2 & 4 \\ 3 & 1 & 0 \\ -2 & 3 & 6 \end{bmatrix} \begin{bmatrix} 3 & 0 & -2 \\ -9 & 1 & 6 \\ 11/2 & -1/2 & -7/2 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}.$$

(4 marks)

Q5 (a) How many ways can a coach choose 5 players from 10 candidates?

(2 marks)

(b) A debating team consists of three boys and two girls. Find the number of ways they can sit in a row if

- (i) they sit in any order.
- (j) the same sex are to sit together.
- (ii) the girls and the boys are to sit alternately.

(8 marks)

(c) Given a minimum problem as below:

Minimize:

$$C = 3s + 7t + u$$

Subject to:

$$s + u \leq 6$$

$$2s + t > 4$$

$$s > 0, \quad t > 0, \quad u > 0.$$

- (i) Rewrite the constraints in the standard form.
- (ii) Find the dual maximum problem.
- (iii) Put the data into initial simplex tableau.

(10 marks)

- Q6 (a) The Cameron Hill Furniture Company produces chairs and tables.

Each table takes four hours of labour from the carpentry department and two hours of labour from the finishing department.

Each chair requires three hours of carpentry and one hour of finishing. During the current week, 240 hours of carpentry time are available and 100 hours of finishing time.

IF each table produced gives a profit of RM70 and each chair gives a profit of RM50, find how many tables and chairs should be made to maximize the total profit.

(14 marks)

- (b) Solve $\int_1^1 \int_2^3 3y^2 + 2x - 12x^2 y^3 \, dx \, dy$.

(6 marks)