UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2009/2010

SUBJECT	:	MATHEMATICS FOR REAL ESTATE MANAGEMENT
CODE	:	BSM 1812
COURSE	:	1 BPD
DATE	:	NOVEMBER 2009
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS IN **PART A** AND **TWO (2)** QUESTIONS IN **PART B**

THIS EXAMINATION PAPER CONSISTS OF 6 PAGES

PART A

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

(i) $y = \frac{3-(1/x)}{x+5}$.

(ii) $y = (\sin(e^{2x}))^2$.

(iii) $y = xe^{\cos x}$.

(11 marks)

(b) If $y = \ln\left(\frac{\sin x}{\cos x}\right)$, show that $\frac{dy}{dx} = \sec x \csc x$. Then, evaluate $\frac{dy}{dx}$ when $x = \frac{\pi}{4}$.

(6 marks)

(c) Let P be the total profit (in thousand), for a mathematics module in t (month) given by the formula

$$P(t) = \frac{110t^3}{t^3 + 55}.$$

(i) Determine the total profit for $t = 12$ months.

(ii) Find the rate of profit, $\frac{dP}{dt}$.

(iii) Calculate the rate of profit for $t = 12$ months.

(8 marks)

Q2 (a) By using the substitution method, integrate

(i) $\int_0^2 \frac{4x}{(x^2+1)^2}\,dx$.

(ii) $\int e^{\cos x} \sin x \; dx$.

(10 marks)

(b) Find the area of the indicated region in **Figure Q2(b)**.

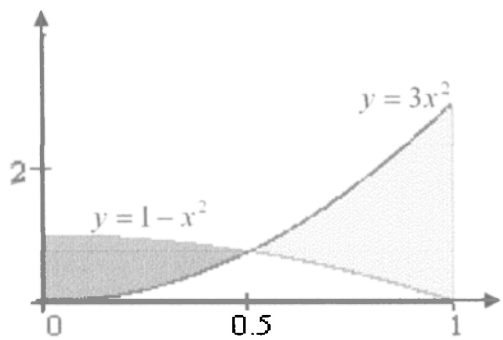

Figure Q2(b)

(9 marks)

(c) Evaluate $\int_1^2 \int_y^{2y} (x - y)\, dx\, dy$.

(6 marks)

PART B

Q3 (a) Determine the range values of x that satisfies the inequality below.

(i) $|3x + 7| < 5$.

(ii) $\dfrac{1}{x+4} - \dfrac{2}{x-3} \geq 0$.

(13 marks)

(b) Let p be "It is cold" and let q be "It is raining". Give a simple sentence which describes each of the following statement.

(i) $\sim p$. (ii) $p \wedge q$. (iii) $q \vee \sim p$.

(3 marks)

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

If I work, then I cannot study.
If I cannot study, I cannot pass mathematics.
I worked.

Therefore, I passed mathematics.

(9 marks)

Q4 Given

$$Q = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 4 \\ 1 & 3 & 9 \end{bmatrix}.$$

(a) Find the inverse of matrix Q by using the *elementary row operation.*

(15 marks)

(b) Given the curve $y = u + vx + wx^2$ where u, v and w are constants, passes through the points (1, 5), (2, 4) and (3, 1).Write 3 linear equations to represent the above information.

(3 marks)

(c) From Q4(b), form a matrix equation. Hence, find the values of u, v and w by using *inverse matrix method* .

(7 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 he can choose do either all the multiple-choice questions or all the true-false questions?

(4 marks)

(b) After wake up in the morning, Ahmad has to take a bath, brush his teeth and wash his face. After that he has to choose among 4 dresses to wear and then he will go to Mamak's stall to eat nasi lemak or roti canai or fried noodles and drink either tea or coffee. After breakfast he will either go to his office or visit the construction site. How many selections can Ahmad make this morning?

(5 marks)

(c) Company ZZZ manufacture toys A, B and C. Each requires rubber, plastic and aluminum as listed below

Toy	Rubber	Plastic	Aluminum
A	2	2	4
B	1	2	2
C	1	2	4

The company has available 600 units of rubber, 800 units of plastic and 1400 units of aluminum. The company makes a profit of RM4, RM3 and RM2 on toys A, B and C respectively. Assume all toys manufactured can be sold. By using the simplex method, determine a production order so that the profit is maximum.

(16 marks)

FINAL EXAMINATION

SEMESTER / SESSION: SEM I / 2009/2010 COURSE : 1 BPD

SUBJECT : MATHEMATICS FOR REAL ESTATE MANAGEMENT CODE : BSM 1812

Differentiation
$\frac{d}{dx}[\frac{x^{n+1}}{n+1}] = x^n, \quad n \neq -1$
$\frac{d}{dx}[e^x] = e^x$
$\frac{d}{dx}[\ln x] = \frac{1}{x}$
$\frac{d}{dx}[\sin x] = \cos x$
$\frac{d}{dx}[\cos x] = -\sin x$
$\frac{d}{dx}[\tan x] = \sec^2 x$
$\frac{d}{dx}[\cot x] = -\csc^2 x$
$\frac{d}{dx}[\sec x] = \sec x \tan x$
$\frac{d}{dx}[\csc x] = -\csc x \cot x$