SET B

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2011 SESSION

SUBJECT CODE	:	FKD 22302
SUBJECT TITLE	:	MATHEMATICS FOR TECHNOLOGISTS 3
LEVEL	:	DIPLOMA
TIME / DURATION	:	12.30pm - 2.30pm (2 HOURS)
DATE	:	07 MAY 2011

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. Please write your answers on the answer booklet provided.
3. Answer should be written in blue or black ink except for sketching, graphic and illustration.
4. This question paper consists of TWO (2) sections. Section A and B. Answer all questions in Section A. For Section B, answer TWO (2) questions only.
5. Answer all questions in English.
7. Fomula is appended.

THERE ARE 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 30 marks)

INSTRUCTION: Answer ALL questions.
Please use the answer booklet provided.

Question 1

Find all first partial derivatives of $z = \sqrt{x^2 + y^2}$. (6 marks)

Question 2

Evaluate $\int_1^3 \int_0^1 y(1 + 4xy)\, dx\, dy$ (7 marks)

Question 3

Points D (1, 4, -7) , E (2, -1, 4) and F (0, 2, -3) form a triangle,

a) find the angle between $\overrightarrow{ED}$ and $\overrightarrow{EF}$ (4 marks)

b) find the area of triangle DEF. (2 marks)

c) determine and state whether $\overrightarrow{ED}$ and $\overrightarrow{EF}$ are perpendicular or not. (1 mark)

Question 4

The data set are given as below:

4, 7, 11, 8, 2, 1, 1, 4, 4, 7

a) Find the median of this data set. (1 marks)

b) Determine the mode and range. (2 marks)

c) Find the mean of the data. (2 marks)

Question 5

D	E	T	E	R	M	I	N	A	T	I	O	N

A card is picked randomly from the cards above. Find the probability of getting a card with

a) letter N (1 mark)

b) letter E (1 mark)

c) letter T or I (2 marks)

d) letter L and R (1 mark)

SECTION B (Total: 20 marks)

INSTRUCTION: Answer only TWO questions.

Please use the answer booklet provided.

Question 1

A survey was done in a company to find out whether or not the staffs have a *facebook* account. The following table summarizes the responses.

	YES (Y)	NO (N)
Male (M)	500	100
Female (F)	250	150

If a person is selected at random, find the probability that the person

a) has a *facebook* account. (1 mark)

b) is a female. (1 mark)

c) has no *facebook* account given that the person is a male. (1 mark)

d) is a male or has a *facebook* account. (2 marks)

e) is a male and has no facebook account. (1 mark)

f) is a female or has no *facebook* account. (2 marks)

g) has a *facebook* account or has no facebook account. (1 mark)

h) is a female given that the adult has a *facebook* account. (1 mark)

Question 2

a) If $\mathbf{a} = -\mathbf{i} - 2\mathbf{j} + \mathbf{k}$ and $\mathbf{b} = 3\mathbf{i} + 5\mathbf{j} - 7\mathbf{k}$.

i) Find $|2\mathbf{a} - 3\mathbf{b}|$. (3 marks)

ii) Find the unit vector for $2\mathbf{a} - 3\mathbf{b}$ (1 mark)

b) Let $\mathbf{u} = 3\mathbf{i} + 5\mathbf{j} - 7\mathbf{k}$ and $\mathbf{v} = 4\mathbf{i} - 3\mathbf{j} - 2\mathbf{k}$. Show that

i) $\mathbf{u} \times \mathbf{v} = -(\mathbf{v} \times \mathbf{u})$ (5 marks)

ii) $(\mathbf{u} \times \mathbf{v}).\mathbf{u} = 0$ (1 mark)

Question 3

Table 1 below shows the frequency distribution of the yearly rainfall (in cm^2) for a 30-year period.

Yearly rainfall (cm^2)	28 – 30	31 - 33	34 - 36	37 - 39	40 - 42	43 - 45	46 - 48
No. of years	3	5	8	3	4	5	2

a) Copy and complete the following frequency distribution table below in your answer booklet. (5 marks)

CLASS INTERVAL	CLASS BOUNDARY	FREQUENCY	CUMMULATIVE FREQUENCY

b) Draw a histrogram (in the graph paper provided) andfind the mode. (2.5 marks)

c) Draw an ogive (in the graph paper provided) and find the median. (2.5 marks)

END OF QUESTION

Table of Differentiation

Trigonometric Functions – GENERAL FORM
$\frac{d}{dx}(\sin f(x)) = \cos f(x) \times f'(x)$
$\frac{d}{dx}(\cos f(x)) = -\sin f(x) \times f'(x)$
$\frac{d}{dx}(\tan f(x)) = \sec^2 f(x) \times f'(x)$
$\frac{d}{dx}(\csc f(x)) = -\csc f(x)\cot f(x) \times f'(x)$
$\frac{d}{dx}(\sec f(x)) = \sec f(x)\tan f(x) \times f'(x)$
$\frac{d}{dx}(\cot f(x)) = -\csc^2 f(x) \times f'(x)$

Exponential Function – GENERAL FORM
$\frac{d}{dx}\left(e^{f(x)}\right) = e^{f(x)} \times f'(x)$

Logarithmic Function – GENERAL FORM
$\frac{d}{dx}(\ln f(x)) = \frac{f'(x)}{f(x)}$

Table of Integration

Trigonometric Functions – GENERAL FORM Where : $f(x)=ax+b$
$\int \cos f(x)\,dx = \frac{\sin f(x)}{f'(x)} + C$
$\int \sin f(x)\,dx = \frac{-\cos f(x)}{f'(x)} + C$
$\int \sec^2 f(x)\,dx = \frac{\tan f(x)}{f'(x)} + C$
$\int \sec f(x)\tan f(x)\,dx = \frac{\sec f(x)}{f'(x)} + C$
$\int \csc f(x)\cot f(x)\,dx = \frac{-\csc f(x)}{f'(x)} + C$
$\int \csc^2 f(x)\,dx = \frac{-\cot f(x)}{f'(x)} + C$

Exponential Function – GENERAL FORM Where : $f(x)=ax+b$
$\int e^{f(x)}\,dx = \frac{e^{f(x)}}{f'(x)} + C$

Logarithmic Function – GENERAL FORM Where : $f(x)=ax+b$
$\int \frac{1}{f(x)}\,dx = \frac{\ln\lvert f(x)\rvert}{f'(x)} + C$