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CONFIDENTIAL

SET A

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION

SEPTEMBER 2014 SESSION

SUBJECT CODE	:	**FKD22302**
SUBJECT TITLE	:	**MATHEMATICS FOR TECHNOLOGISTS 3**
LEVEL	:	**DIPLOMA**
TIME / DURATION	:	**8.00 PM – 10.00 PM (2 HOURS)**
DATE	:	**2 JANUARY 2015**

INSTRUCTIONS TO CANDIDATES

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

THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 30 marks)

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

Question 1

Determine all partial derivatives of $z(x, y) = 2x^3 + 5xy^2 - 5$, at $x = 3, y = 2$.

(6 marks)

Question 2

Evaluate $\int_0^1 \int_y^{2-y} e^{3x}\, dx\, dy$. Leaving your answers to 3 decimal places.

(6 marks)

Question 3

Given the position vectors $\overrightarrow{OP}$, $\overrightarrow{OQ}$ and $\overrightarrow{OR}$

$\overrightarrow{OP} = \underset{\sim}{i} + 2\underset{\sim}{j}$

$\overrightarrow{OQ} = 3\underset{\sim}{i} + 5\underset{\sim}{j} + \underset{\sim}{k}$

$\overrightarrow{OR} = 4\underset{\sim}{i} + \underset{\sim}{k}$

Determine:

a) $\overrightarrow{PQ}$

(1 mark)

b) $\overrightarrow{QR}$

(1 mark)

c) $\overrightarrow{PQ} \bullet \overrightarrow{QR}$

(2 marks)

Question 4

If $\underset{\sim}{x} = 2\underset{\sim}{i} + \underset{\sim}{j}$ and $\underset{\sim}{y} = \underset{\sim}{i} + 7\underset{\sim}{j}$, determine the values of m if $3\underset{\sim}{x} + 2m\underset{\sim}{y}$ is parallel to x-axis.

(4 marks)

Question 5

Events A and B are independent such that $P(A) = 0.2$ and $P(B) = 0.7$. Determine:

a) $P(A \cap B)$.

(2 marks)

b) $P(A \cup B)$.

(2 marks)

Question 6

Given that $n = 11$ measurements: 3, 5, 7, 6, 9, 4, 11, 2, 4, 6, 1.

a) Calculate the mean (Leaving your answer to 3 decimal places).

(2 marks)

b) Determine the median.

(2 marks)

c) State the mode.

(2 marks)

SECTION B (Total: 20 marks)

INSTRUCTION: Answer <u>TWO</u> questions only.
Please use the answer booklet provided.

Question 1

The vertices of a parallelepiped are: $A(3,-2,1)$, $B(5,-4,0)$ and $A(0,1,1)$.

a) Determine position vectors $\overrightarrow{OA}$, $\overrightarrow{OB}$ and $\overrightarrow{OC}$.

(3 marks)

b) Determine $\overrightarrow{OA} \times \overrightarrow{OB}$.

(3 marks)

c) Calculate the volume of parallelepiped.

(4 marks)

Question 2

FIGURE 1 shows a survey of 498 people from different age groups on the understanding of Goods and Services Tax (GST). The survey is categorized into **Understand group** and **Not understand group**. (Resources: Public opinion survey 2014 Peninsular Malaysia Voter Survey).

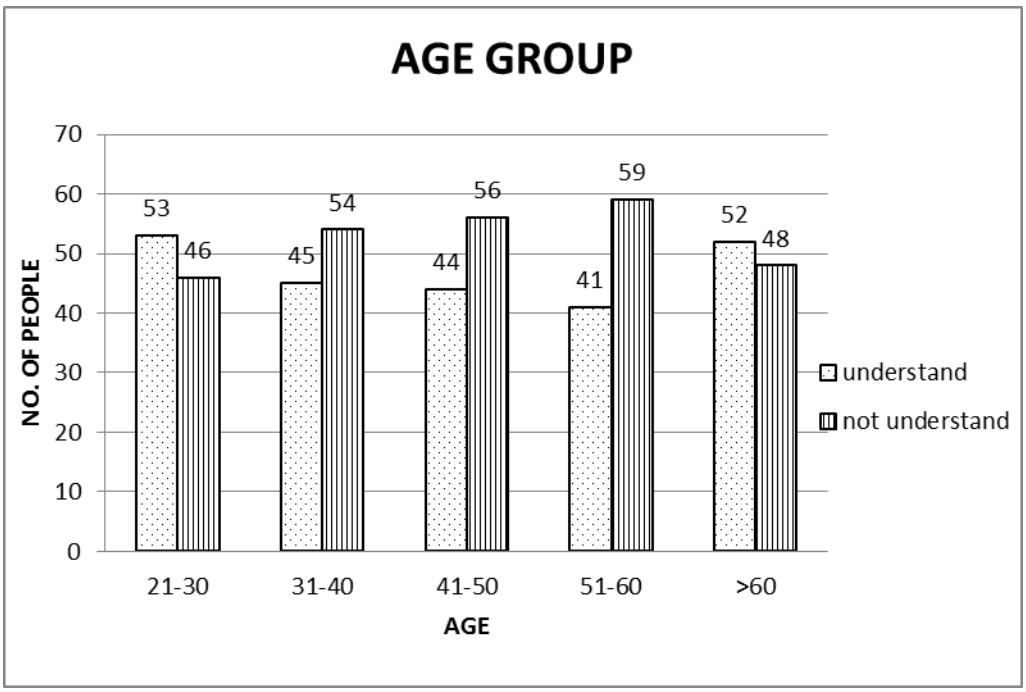


FIGURE 1

From **FIGURE 1**,

a) Determine the total number of people in the **not understand group** category.

(2 marks)

b) Complete the Frequency Distribution Table for the **understand group** category given in **APPENDIX 3**.

(3 marks)

c) Draw an Ogive (Cumulative Frequency Graph) representing the Table in **APPENDIX 3**.

(3 marks)

d) Refer to the Ogive in (c), determine the percentage of people who understand about GST in the group below, leaving your answers to 2 decimal places.

i. Below than 35 years.

(1 mark)

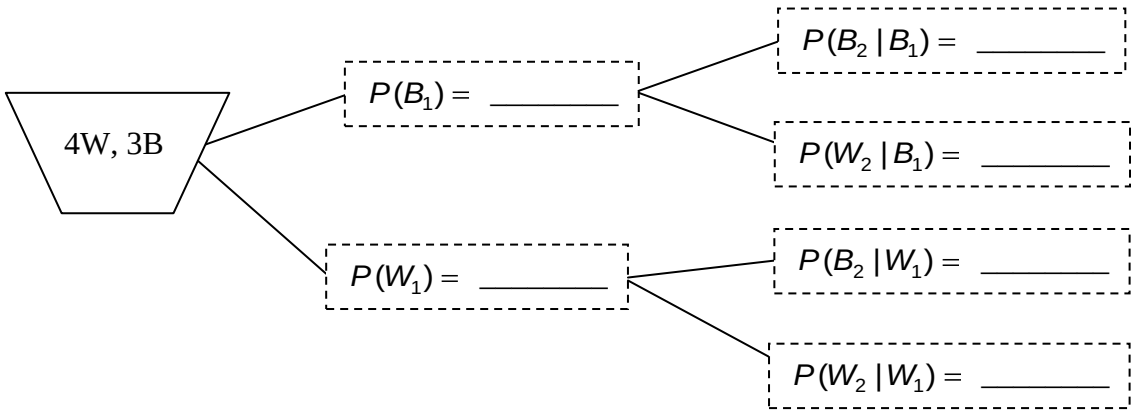
ii. More than 40 years.

(1 mark)

Question 3

One bag contains 4 white balls and 3 black balls. If 2 balls are picked at random without replacement,

a. Copy and complete the following Tree Diagram.



(3 marks)

b. Determine the following probabilities:

i. If the two balls are of the same color.

(4 marks)

ii. If the two balls are of different color.

(3 marks)

END OF QUESTION

APPENDIX 1

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
$\frac{d}{dx}(e^{f(x)}) = e^{f(x)} \times f'(x)$

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

APPENDIX 2

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 : $f(x) = ax + b$
$\int \frac{1}{f(x)}\,dx = \frac{\ln\lvert f(x)\rvert}{f'(x)} + C$

APPENDIX 3

NAME: _____

STUDENT ID NUMBER: _____

SEAT NO: _____

Please attach the APPENDIX 3 in the answer booklet provided.

FREQUENCY DISTRIBUTION TABLE

CLASS	CLASS BOUNDARY	FREQUENCY, (f)	CUMULATIVE FREQUENCY
21-30			
31-40			
41-50			
51-60			
>60			
		$\sum(f)=$	