UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY

FINAL EXAMINATION
JANUARY 2016 SEMESTER

COURSE CODE	:	IGB 12102
COURSE NAME	:	MATHEMATICS FOR TECHNOLOGIST 1
PROGRAMME NAME	:	BACHELOR
DATE	:	20 MAY 2016
TIME	:	3.00 pm – 5.30 pm
DURATION	:	2½ HOURS

INSTRUCTIONS TO CANDIDATES

1. Please CAREFULLY read the instructions given in the question paper.
2. This question paper has information printed on both sides of the paper.
3. This question paper consists of ONE (1) section.
4. Answer ALL questions.
5. Please write your answers on the answer booklet provided.
6. Answer all questions in English language ONLY.

(Total 100 marks)

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

Question 1

(a) Given $4(4x)+2(x)=72$. Solve for x

[4 marks]

(b) The equations $4x+y=28.5$ and $3x+2y=32$ represent the money collected from university exhibition tickets sales during two class periods. If x represents the cost for each student and y represents the cost for each public ticket, calculate the cost for each public and student ticket respectively.

[7 marks]

(c) The currents running through an electrical system are given by the following system of equation below. The three currents, I_1, I_2 and I_3 are measured in amps. Solve the system to determine the currents in this circuit.

$$I_1+2I_2-I_3=0.425$$
$$3I_1-I_2+2I_3=2.225$$
$$5I_1+I_2+2I_3=3.775$$

[14 marks]

TOTAL [25 Marks]

Question 2

(a) Given $y = 3(x-2)^2 - 4$, determine the vertex point.

[3 marks]

(b) Consider $c^2 - 12 = c$,

i. By using quadratic formula, solve for c

[6 marks]

ii. Determine the characteristic of the solution and state the reason

[2 marks]

(c) Draw a quadratic graph if given the vertex point is $(1,4)$ and y-intercept is 3 for the quadratic equation $y = -x^2 + 2x + 3$.

[5 marks]

(d) The height of a triangle is 2mm less than the base. If the area is 60mm^2, determine the height and base of the triangle.

[9 marks]

TOTAL [25 Marks]

Question 3

(a) Factorize $24x^2 - 6xy - 9y^2$

[4 marks]

(b) A rectangular swimmping pool is twice as long as it is wide. A small concrete walkway surrounds the pool. The walkway is a constant two feet wide. Total area of the pool and walkway is 196 feet^2. Determine the dimensions of the pool (***hint: w and L***).

[11 marks]

(c) Simplify $\frac{5x+15}{x^2-9}$,

[3 marks]

(d) An engineer is working on how to create diving board model as a simple centilver. He uses a diver of mass with Xkg stands on the end of fibreglass, (Young modulus, E=8Gpa) diving board 3m in length. Below is the completed model that he manages to build.

$$\upsilon = \frac{P}{EI}\left(\frac{X_3}{6} + \frac{LX}{2} + \frac{L}{3}\right)$$

i. Solve the model if he wants the length (L) to be the subject of the model.

[5 marks]

ii. Hence, determine the value of the length if given

$\upsilon = 2,\ E = 8,\ I = 1,\ P = 100,\ X_3 = 0$ and $X = 2$

[2 marks]

TOTAL [25 Marks]

Question 4

(a) Given that the following matrices are equal. Determine the values of *x*, *y* and *z*.

$$\begin{pmatrix} x+3 & -1 \\ 4 & 5 \end{pmatrix} = \begin{pmatrix} 6 & y \\ z-3 & 5 \end{pmatrix}$$

[5 marks]

(b) Consider $A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} 7 & 8 \\ 9 & 10 \\ 11 & 12 \end{pmatrix}$. Determine:

i. The size of matrix *A* and matrix *B*

[2 marks]

ii. *AB*

[3 marks]

(c) A nut distributor wants to know the nutritional content of various mixtures of almonds, cashews and pecans. Her supplier has provided the following nutrition information.

Table 1: Nutritional Content

	Protein blend	Low fat mix	Low carb mix	Total
Almond (cups)	6	3	3	**15**
Cashews (cups)	3	6	1	**10**
Pecan (cups)	1	1	6	**5**

i. Form the table into matrix form on how to determine the amount of protein, low carb and low fat mix in a 1 cup serving of the mixture.

[3 marks]

ii. Calculate D_x, D_y and D_z

[9 marks]

iii. Solve for x, y and z if given $D = 150$

[3 marks]

TOTAL [25 Marks]

END OF QUESTION