



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2012/2013**

COURSE NAME : MATHEMATICS FOR
REAL ESTATE MANAGEMENT

COURSE CODE : BPE15002/BWM10702/BSM1812

PROGRAMME : 1BPD/ 2BPD/ 4BPD

EXAMINATION DATE : DECEMBER 2012/JANUARY 2013

DURATION : 2 HOURS

INSTRUCTION : 1. ANSWER ALL QUESTIONS.
2. ALL CALCULATIONS AND ANSWERS
MUST BE IN **THREE (3)** DECIMAL
PLACES.

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

- Q1** (a) Solve the following inequalities.
- (i) $3 - 4x < 12$
- (ii) $2x - 3 \leq 7 - 7x \leq 3x + 7$.
- (9 marks)
- (b) Given $2 \begin{pmatrix} -13 & 7 \\ 12 & 11 \end{pmatrix} + 3 \begin{pmatrix} 4 & 0 \\ -1 & y \end{pmatrix} = 7 \begin{pmatrix} x & 2 \\ 3 & 1 \end{pmatrix}$. Find the values of x and y .
- (6 marks)
- (c) Show that $\sim p \wedge \sim q$ is *logically equivalence* to $\sim(p \vee q)$.
- (10 marks)
- Q2** (a) There are 10 students in class A, 11 students in class B, and 9 students in class C. How many choices do we have if
- (i) we want to choose a president, a vice president, a secretary and a treasurer for the whole group?
- (ii) we want to arrange 2 students from every class to sit in a row of 6 seats?
- (7 marks)
- (b) The stationery department provides 3 colours of marker pen. A staff wants to take 4 marker pens. How many possible selections does he have?
- (3 marks)
- (c) Sketch
- (i) the point $(-1, 2, 3)$ in 3D-space.
- (ii) Sketch vector $v = 3i - 2j + k$.
- (7 marks)
- (d) Find the magnitude of vector \mathbf{u} and calculate the distance between vectors \mathbf{u} and \mathbf{v} , if $\mathbf{u} = (3, 2, 1)$ and $\mathbf{v} = (4, 3, -1)$.
- (8 marks)

- Q3** (a) For the vectors $\mathbf{a} = 5\mathbf{i} + \mathbf{j} + \mathbf{k}$ and $\mathbf{b} = 2\mathbf{i} + 9\mathbf{j} + \mathbf{k}$, find $\mathbf{a} \cdot \mathbf{b}$ and determine the angle between these vectors. (7 marks)

- (b) A linear programming problem is given below.

$$\text{Minimize } z = 3x_1 + 2x_2$$

subject to the constraints

$$4x_1 + x_2 \geq 12$$

$$x_1 + x_2 \leq 10$$

$$x_1 + 3x_2 \geq 15$$

$$-x_1 + 2x_2 \geq 2$$

$$x_1, x_2 \geq 0$$

- (i) Determine the feasible region using the graphical procedure.
 (ii) Calculate the value of z at each corner point.
 (iii) Give the optimal solution.

(18 marks)

- Q4** A furniture company produces chairs and tables from two resources, which are labor and wood. The company has 80 hours and 36 kg of wood available each day. Demand for chairs is limited to six per day. Each chair requires 8 hours of labor and 2 kg of wood to produce, while a table requires 10 hours of labor and 6 kg of wood. The profit derived from each chair is RM400 and from each table is RM100. The company wants to determine the number of chairs and tables to produce each day in order to maximize profit.

- (a) Formulate the problem in a linear programming model. (10 marks)

- (b) Solve the model in Q4(a) by using the simplex method. (15 marks)

- END OF QUESTION -