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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

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

COURSE NAME : MATHEMATICS FOR REAL
ESTATE MANAGEMENT

COURSE CODE : BPE 15002 / BSM 1812

PROGRAMME : 1 BPD

EXAMINATION DATE : JUNE 2013

DURATION : 3 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS.

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) (i) Find the solutions of the inequality $|2x - 5| > x + 1$.
- (ii) Ashley has RM20 and needs to buy three birthday cards at RM2.55 each. With the left over money she would like to buy as many thank you cards as possible. If the thank you cards cost RM2.99 each, calculate the number of thank you cards she can purchase.

(10 marks)

- (b) If Smith is elected president, Kuntz will be elected secretary.
If Kuntz is elected secretary, then Brown will not be elected treasurer.
Smith is elected president.

Show that Brown is not elected treasurer.

(10 marks)

- Q2** (a) (i) In traveling from Seremban to Taiping, Mr. Lim wishes to stop over in Kuala Lumpur. If he has five different routes to choose in driving from Seremban to Kuala Lumpur and has three routes to choose in driving from Kuala Lumpur to Taiping, calculate the number of ways Mr. Lim can travel from Seremban to Taiping.
- (ii) Suppose we are setting up a code of two-letter “words” and have five different letters, a, b, c, d, e , from which to choose. If the code must not repeat any letter, and if such words as ab and ba are considered different, calculate the number of different words that can be formed.
- (iii) A committee of four is to be chosen from five faculty members and four students that includes two students and two faculty members. Calculate the number of ways that can this be done.

(10 marks)

- (b) (i) Given that $A = (2, 3)$ and $B = (5, 4)$. Use the graphical representation to find the vector with initial point at A and terminal point at B .

- (ii) For the vector $\mathbf{a} = 4\mathbf{i} + 2\mathbf{j} - 5\mathbf{k}$, find the magnitude of the vector.

(10 marks)

- Q3 (a)** Solve the following system of linear equations by using any appropriate method.

$$x + 2y + 2z = 3$$

$$2x + 5y + 7z = 2$$

$$2x + y - 4z = 4$$

(10 marks)

- (b)** A chemistry laboratory can be used by 38 students at one time. The laboratory has 16 work stations, some set up for 2 students each and the others set up for 3 students each.

Determine the number of each kind of work stations.

(10 marks)

- Q4 (a)** Solve the following linear programming model by using graphical approach.

Minimize $Z = 8x_1 + 12x_2$

Subject to

$$5x_1 + 2x_2 \geq 20$$

$$4x_1 + 3x_2 \geq 24$$

$$x_2 \geq 2$$

$$x_1, x_2 \geq 0$$

(10 marks)

- (b)** Let x_1 = quantity of product 1 to produce,
 x_2 = quantity of product 2 to produce, and
 x_3 = quantity of product 3 to produce.

The linear programming (LP) model is

Maximize $5x_1 + 8x_2 + 4x_3$ (profit)

Subject to

Labor $2x_1 + 4x_2 + 8x_3 \leq 250$ hours

Material $7x_1 + 6x_2 + 5x_3 \leq 100$ kg

Product 1 $x_1 \geq 10$ units

$$x_1, x_2, x_3 \geq 0$$

- (i)** Illustrate the components of the LP model.
(ii) Calculate the profit for $x_1 = 10$, $x_2 = 0$ and $x_3 = 6$.

(10 marks)

- Q5 (a)** Give the initial simplex tableau for the linear programming model.

$$\begin{array}{ll}
 \text{Maximize} & P = 60x_1 + 50x_2 \\
 \text{Subject to} & \\
 \text{Assembly} & 4x_1 + 10x_2 \leq 100 \\
 \text{Inspection} & 2x_1 + 1x_2 \leq 22 \\
 \text{Storage} & 3x_1 + 3x_2 \leq 39 \\
 & x_1, x_2 \geq 0
 \end{array}$$

where x_1 = the number of type 1 computers and x_2 = the number of type 2 computers.

(10 marks)

- (b)** An appliance manufacturer produces two models of microwave ovens: H and W . Both models require fabrication and assembly work; each H uses four hours of fabrication and two hours of assembly, and each W uses two hours of fabrication and six hours of assembly. There are 600 fabrication hours available this week and 480 hours of assembly. Each H contributes RM40 to profits, and each W contributes RM30 to profits.

Formulate the problem as a linear programming model.

(10 marks)

- END OF QUESTION -