UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2015/2016

COURSE NAME   :   MATHEMATICS FOR REAL ESTATE
                         MANAGEMENT

COURSE CODE   :   BPE 15002

PROGRAMME   :   1 BPD

EXAMINATION DATE   :   DECEMBER 2015/JANUARY 2016

DURATION   :   2 HOURS

INSTRUCTION   :   ANSWER **ALL** QUESTIONS

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

Q1   (a)   Draw the graphical representation to show the vector with initial point $\mathbf{A} = (2, 4)$ and terminal point $\mathbf{B} = (5, 6)$.

<div align="right">(6 marks)</div>

       (b)   Let $\mathbf{a} = (7, 2)$ and $\mathbf{b} = (-3, 5)$. Calculate:

           (i) $\mathbf{a} - 6\mathbf{b}$

<div align="right">(3 marks)</div>

           (ii) $3\mathbf{a} + 4\mathbf{b}$

<div align="right">(3 marks)</div>

           (iii)   Magnitude of $\mathbf{b}$

<div align="right">(3 marks)</div>

       (c)   Prove that

$$\mathbf{p} \bullet (\mathbf{q} \times \mathbf{r}) = (\mathbf{p} \times \mathbf{q}) \bullet \mathbf{r}$$

for vectors $\mathbf{p} = (2, 1, 1)$, $\mathbf{q} = (1, -1, 1)$ and $\mathbf{r} = (3, 7, 4)$.

<div align="right">(10 marks)</div>

Q2   (a)   Let

$$A = \begin{pmatrix} 3 & 4 \\ 1 & -2 \end{pmatrix} \text{ and } B = \begin{pmatrix} 1 & 3 \\ -2 & 8 \end{pmatrix}$$

          Compute:

           (i)   A+B

<div align="right">(2 marks)</div>

           (ii)   AB

<div align="right">(2 marks)</div>

           (iii)   det (AB)

<div align="right">(2 marks)</div>

           (iv)   Inverse matrix of A

<div align="right">(4 marks)</div>

       (b)   Given

$$-3x + 2y - 6z = 6$$
$$5x + 7y - 5z = 6$$
$$x + 4y - 2z = 8$$

Solve the system of linear equations by using Gauss elimination method.

<div align="right">(15 marks)</div>

Q3   Find the maximum and minimum value of $Z = x + 4y$

Subject to
$$2y + x \geq 10$$
$$2y + 3y \leq 24$$
$$y \leq 4x$$
$$x, y \geq 0$$

(a)   Sketch a graph to illustrate the feasible region.

(8 marks)

(b)   Determine the corner points of the feasible region.

(7 marks)

(c)   Compute the maximum value.

(5 marks)

(d)   Compute the minimum value.

(5 marks)

Q4   Find the maximum value of $p = 3x + 2y + z$

Subject to
$$2x + 2y + z \leq 10$$
$$x + 2y + 3z \leq 15$$
$$x \geq 0, y \geq 0, z \geq 0$$

(a)   Construct the initial simplex tableau.

(6 marks)

(b)   Solve the **Q4 (a)** to obtain the final tableau.

(19 marks)

-END OF QUESTIONS-

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