# University of Kelaniya - Sri Lanka

## Centre for Open and Distance Learning

## Faculty of Commerce and Management Studies

Bachelor of Business Management (General) Degree

Year I Examination (External) – 2008

### BMGT E 1055/ BMGT 13055 – Mathematics for Business

No of questions – 06                    Time: 03 Hours
Answer 05 questions only

(01)  (i)  Let A,B and C are three subsets of the universal set of U and they are shown below.

   U = {r,s,t,u,v,w,x,y,z}
   A = {t,u,v,w}
   B = {t,u,v,x}
   C = {u,x,y}

   (a)  Draw a venn diagram to represent the above sets together with their elements.

   (b)  Using the sets in (1) above find the elements of the following
       (i)    $A \cap B$
       (ii)   $A \cap C$
       (iii)  $B \cap C$
       (iv)   $A \cap B \cap C$
       (v)    $(A \cap B)'$
       (vi)   $(A \cup B) \cap C$                           (09 marks)

   (ii)  Simplify
       (a)  $a^3 \div a^5$                                  (01 marks)

       (b)  $\left( \dfrac{125}{27} \right)^{-2/3}$         (03 marks)

   (iii)  $\log 100 - 2 \log 50$                            (02 marks)

   (iv)  If $5^x = 10$, Find x                              (02 marks)

   (v)  A planter plants out 386 coffee plants on the basis of several rows with 15 plants each and several other rows with 17 plants each. There are 24 rows altogether. How many rows are there with 17 plants in each.
                                                            (03 marks)
                                                       (Total 20 marks)

(02)  (i)  Factories the following expressions.
       (a)  $x^4 - 3x^3 + 4x^2 - 8$
       (b)  $x^3 + a^3$
       (c)  $27x^3 - 1$

                                                            (06 marks)

(ii) Determine the nature of the roots of the following equations.
$$4x^2 - 12x - 9 = 0$$
$$2x^2 - 5x + 3 = 0$$

(04 marks)

(iii) Solve the following equations.
(a) $2x^2 - 14x = 0$
(b) $t(t - 3) = t^2 - 4$

(04 marks)

(iv) The $n^{th}$ term of an Arithmetic Progression is $12 - 4n$. Find the first term and the common difference.

(03 marks)

(v) In a certain geometric series, the third term is 144 and the sixth term is 486. Find the summation of first five terms.

(03 marks)
(Total 20 marks)

(03) (i) Write in factorial form,

$$\frac{9 \times 8 \times 7}{4 \times 3 \times 2}$$

(01 marks)

(ii) Fatorise

(a) $8! - 4\,(7!)$ (01 marks)
(b) $(n + 2) + n\,(n - 1)!$ (03 marks)

(iii) Expand :

(a) $(a + b)^4$
(b) $(1 + 3y)^3$ (04 marks)

(iv) How many distinct permutations can be made from the words;
(a) EXAMINATION
(b) DIFFERENTIATION (04 marks)

(v) Four books and taken from a shelf of eighteen books, of which six are novels and twelve are management books. In how many ways can the four books be selected., At least one of the selected books out of 4 should be a novel.

(06 marks)
(Total 20 marks)

(04) (i) If $A = \begin{pmatrix} 1 & 3 & 4 \\ 1 & 2 & 3 \\ -1 & 0 & 2 \end{pmatrix}_{(3 \times 3)}$ and $B = \begin{pmatrix} 1 & 3 & 0 \\ -1 & 2 & 1 \\ 0 & 2 & 1 \end{pmatrix}_{(3 \times 3)}$

Find AB and BA

(06 marks)

(ii) Find the inverses of the following matrices.

(a) $A = \begin{pmatrix} 2 & 3 \\ -1 & 2 \end{pmatrix}_{(2 \times 2)}$

(03 marks)

(b)
$$B = \begin{pmatrix} 1 & -1 & 1/2 \\ -3 & 0 & 2 \\ 2 & -1 & 3 \end{pmatrix} (3 \times 3)$$

(05 marks)

(iii)   Solve the following system of equations using matrices.

$x - 3y + z = -1$
$2x + y - 4z = -1$
$6x - 7y + 8z = 7$

(06 marks)
(Total 20 marks)

(05)   (i)   Differentiate   $f(x) = \dfrac{4x^2 + x - 1}{2x}$

(02 marks)

(ii)   Find the gradient of the curve   $Y = (x - 3)(x + 2)$ at the point $x = 1$ on the curve.

(06 marks)

(iii)   Differentiate with respect to x ;

(a)   $x^4 - 9x^3 + 6$
(b)   $\dfrac{x^3 + 2}{x}$

(c)   $\sqrt{x}\ (x - 1)$

(06 marks)

(iv)   Find the first order partial derivatives of the following functions.
(a)   $Y = f(a,b) = 3a^3 b + 2ab - a^2 b^2$

(b)   $Y = f(p,q) = (p - 5q) / (1/p + pq)$

(06 marks)
(Total 20 marks)

(06)   (i)   Find the given limits of the following expressions.

(a)   $\lim\limits_{a \to 2} \dfrac{a^2 - 81}{a - 3}$

(b)   $\lim\limits_{a \to 3} \dfrac{4a^2 - 25}{5a^2 + 21a - 2}$

(04 marks)

(ii)   Give equations for two straight lines that passes the points (3,5)

(03 marks)

(iii)   Suppose $P = 7.2x - 0.001x^2$ is the monthly depnand for a certain good product.  Suppose $C = 2.4 x - 0.002x^2$ is the cost of producing a unit of item.

(a)   Find the revenue function
(b)   Find the profit for x unit of items.

(05 marks)

(iv)   (a)   Give equations for two circles whose centre is (3,4)

(b)   Give equations  of two straight lines whose gradient is 3

(08 marks)
(Total 20 marks)