

MANIPAL UNIVERSITY
DUBAI CAMPUS

BACHELOR OF BUSINESS ADMINISTRATION (BBA) – I SEMESTER DEGREE
EXAMINATION – JANUARY 2010

SUBJECT: MATHEMATICS FOR BUSINESS (MAT-101)

Monday, January 11, 2010

Time: 9.00 to 12.00 Hrs.

Max. Marks: 100

Answer any five questions (Qn.1 is compulsory)

Q-1-i Explain the three properties of Transpose of Matrix with suitable examples.

Q-1-ii Explain ten types of Matrices with suitable examples.

Q-2-i Solve the following equations using Inverse Method.

$$2X + 5Y + 4Z = 4$$

$$X + 4Y + 3Z = 1$$

$$X - 3Y - 2Z = 5$$

Q-2-ii Determine the Inverse of the Matrix.

$$A = \begin{bmatrix} 8 & 5 & 4 \\ 4 & 7 & 9 \\ 6 & 3 & 2 \end{bmatrix}$$

Q-3-i Find $A^3 - 5A^2 - 5A - 6I_3$ given

$$A = \begin{bmatrix} 3 & 5 & 2 \\ 1 & 7 & 3 \\ 5 & 1 & 32 \end{bmatrix}$$

Where I_3 is identity matrix of order 3×3

Q-3-ii Food I has 3 units of vitamin A, 9 units of vitamin B, and 12 units of vitamin C. Food II has 6 units of vitamin A, 9 units of vitamin B, and 15 units of vitamin C and Food III has 9 units of vitamin A, 0 units of vitamin B, and 9 units of vitamin C. 33 units of vitamin A, 27 units of vitamin B and 60 units of vitamin C are required. Find the amount of three foods that will provide exactly these amounts.

Q-4 Differentiate the following functions with respect to x :

(i) $\sqrt{\frac{(1+e^x)}{(1-e^x)}}$

(ii) $Y = (2x^2 - 5x + 3)^4$

Evaluate (i) $\int x^2 \log x dx$ (ii) $\int \frac{(x+1)(x+\log x)^2}{2x} dx$

Q5-i Let the cost function of a firm be given by the equation $C(x) = 300x - 10x^2 + (x^3/3)$ where $c(x)$ stands for cost function and x for output. Calculate (i) output at which marginal cost is minimum.

Q5-ii Find the Maximum and Minimum values of $y = 2x^3 + 3x^2 - 36x + 10$

Q6-i The XYZ company limited has approximated the marginal revenue function for one of its products by $MR = 20x - 2x^2$. The marginal cost function is approximated by $MC = 81 - 16x + x^2$. The Cost is 40 when $x = 1$. Determine the profit function.

Q6-ii The demand for a certain product is represented by the relation $p = 20 + 5x - x^2$ Where x is the number of units demanded and p is the price per unit. Construct the Marginal Revenue function. What is the Marginal Revenue at $x = 4$

Q7-i The marginal cost of a product is $MC = 4x + 50$ and that of revenue is $MR = 500$; (x : the number of units) the cost of producing 10 units is \$1000.

i. Find the Profit function.

ii. What is the profit if 25 units are produced and sold?

Q7-ii The marginal cost of production is found to be $MC = 2000 - 40x + 3x^2$ Where x is the number of units produced. The fixed cost of production is AED 18000. Find the total cost function and the average cost function.