

Bachelor of Business Management in Entrepreneurship and Management
Bachelor of Business Management in Hospitality, Tourism and Events Management
FIRST YEAR FIRST SEMESTER EXAMINATION – JULY/AUGUST 2016

ENM 161-2/HTE 161-2 Business Mathematics

Instructions to candidates:

No. of pages : Two (02)
No. of questions : 04 Essay Questions
Time : 02 Hours
Marks allocated : 100 Marks

Use standard symbols without definition.

Scientific calculators are allowed.

Answer all questions

1.

a. Let $A = \begin{pmatrix} 8 & -3 \\ 1 & 5 \end{pmatrix}$ and $B = \begin{pmatrix} -5 & 1 \\ 4 & 6 \end{pmatrix}$;

i) find $A + B$. (2 marks)

ii) find $A * B$. (4 marks)

iii) find transpose of matrix A . (2 marks)

b. If $C = \begin{pmatrix} -1 & 4 & 0 \\ 3 & 2 & -5 \\ 2 & 1 & 3 \end{pmatrix}$ find determinant of C , hence find inverse of matrix C .

(10 marks)

c. Solve the following system of linear equations using **Cramer's rule** or **Gauss-Jordan elimination method**.

$$x + 3y - 4z = 0$$

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

$$x + 2y - 5z = 16$$
 (7 marks)

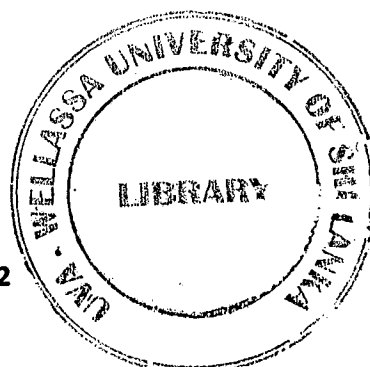
2.

a. Find each of the following limits;

i) $\lim_{x \rightarrow 1} \left(\frac{x^2 - 1}{x^2 - 3x + 2} \right)$ (3 marks)

ii) $\lim_{x \rightarrow 0} \left(\frac{\sqrt{(2x+1)} - 1}{x} \right)$ (3 marks)

iii) $\lim_{x \rightarrow -3} \left(\frac{x^3 + 27}{x^5 + 243} \right)$ (3 marks)



b. Differentiate following functions with respect to x .

i) $y = -2x^4 + 3x^3 + 2x^2 + 1$ (2 marks)

ii) $y = \ln(3x^2 + 2x + 1)$ (2 marks)

iii) $y = \frac{(x^2+1)}{(3x+2)^6}$ (4 marks)

iv) $y = \ln x e^{(x^2+1)}$ (3 marks)

c. Find the stationary points of following function and determine those are relative maximum or relative minimum points, hence sketch the graph.

$$y = x^3 - \frac{3}{2}x^2 - 6x + 10 \quad (10 \text{ marks})$$

3.

a. The cost function for x units of an item, produced and sold by a company is given by

$$C(x) = 250 + 0.005x^2 \text{ and the total revenue is given as } R(x) = 4x.$$

i) Find the profit function. (3 marks)

ii) How many items should be produced to maximize the profit? (3 marks)

iii) What is the maximum profit? (3 marks)

b. Integrate the following functions with respect to x .

i) $\int \left(\frac{1}{(x+1)} + e^{-2x} + 5x^4 + 1 \right) dx$ (4 marks)

ii) $\int \frac{(3x^2+4x+4)}{(x^3+2x^2+4x+1)} dx$ (4 marks)

iii) $\int x e^{4x} dx$ (4 marks)

iv) $\int_{-1}^3 (3x + 5)^3 dx$ (4 marks)

4.

a. Saman's parents deposited Rs.5000.00 into a saving account as a scholarship fund when he was selected to the university. How much he will have in his account after 6 years at a yearly simple interest rate of 11.25%? (5 marks)

b. Mr. Silva invested Rs.12500.00 in a finance company that pays 6.0% interest compounded monthly. Find the value of the investment in 2 years. (5 marks)

c. Ms. Perera obtained a loan of Rs.18000.00 at a constant annual rate of 1.25%. If interest earned is compounded continuously, how much he will pay for the loan after 10 years? (5 marks)

d. Find the future value of an investment, if Rs.7500.00 is deposited at the beginning of each month for 9 years and the interest rate is 7.2% (5 marks)