EASTERN UNIVERSITY, SRI LANKA

FACULTY OF COMMERCE AND MANAGEMENT

FIRST YEAR SECOND SEMESTER EXAMINATION IN

BACHELOR OF BUSINESS ADMINISTRATION/ BACHELOR OF COMMERCE

2014/2015(March 2016) – PROPER / REPEAT / RE-REPEAT

COM 1032 BASIC CALCULUS

All Questions   Time: 02 Hours

(i)   If $f(x)=12(x-2)$ and $h(x) = \sqrt{x-1}$, then find $\dfrac{f(3)}{h(5)}$.

(03 marks)

(ii)   If $f(x) = \sqrt{x}$ and $g(x)=1-3x$, then find

a) $f(g(x))$ b) $g(f(x))$ c) values of x when $f(g(x)) = g(f(x))$.

(06 marks)

iii)   The number of worker-hours required to distribute new telephone books to $x\%$ of the
households in a certain area is given by $h(x) = \dfrac{600x}{300-x}$.

a) What is the domain of the function, h ?

b) For what values of x does $h(x)$ have a practical interpretation in this context?

c) How many worker-hours required distributing new telephone books to the first
75 % of the households?

d) What percentage of the households in the community had received new
telephone books for the 150 worker-hours?

(06 marks)

v)   Evaluate the following limits:

a) $\lim\limits_{x \to -2} (1-2x+x^2)^2$

b) $\lim\limits_{x \to 1} \dfrac{x^2+4x-5}{x^2-1}$

c) $\lim\limits_{x \to \alpha} \dfrac{2x^2+x-1}{3x^2-x+1}$

d) $\lim\limits_{x \to 4} \dfrac{\sqrt{x}-2}{x-4}$

(10 marks)

[Total 25 Marks]

02. (i) Differentiate the following functions with respect to x :

    $a)$ $f(x) = \dfrac{2x-1}{(x^3+2)(x^2-2)}$ $b)$ $f(x) = 9x^{1/3}(x^3+1)$

    $c)$ $f(x) = [\ln (1+e^{\ln x})]^3$ $d)$ $f(x) = \dfrac{x^2 e^{x+1}}{\ln (\sqrt{x+1})}$

(15 ma
(ii

(ii) The total number of computers, N (in thousands), sold during a year is given
$N(t) = 2t + \dfrac{1}{3}t^{3/2}$, where t is the number of months since the beginning of the year

    a) Find $\dfrac{d}{dt}N(t) = N'(t)$.

    b) Find $N(9)$ and $N'(9)$, and interpret these results.

    c) Use the results part in (b) to estimate the sales after 10 months.

(

(07 ma

(iii) Find $\dfrac{dy}{dx}$ for the function $y - xy^2 + x^2 + 1 = 0$.

(03 ma

(25 ma

03. (i) Find and classify all the critical points for the function $f(x) = x^3(x-5)^2$.

(10 Ma

(ii) A firm knows that the demand function for one of its products is linear. It also kno
that it can sell 1000 units when the price is Rs. 4 and it can sell 1500 units when
price is Rs. 2 per unit. Find the demand function.

(03 ma

(iii) A firm has the following demand and the average cost functions:

    $p = 200 - \dfrac{x}{400}$ and $AC = \dfrac{x}{100} + 100 + \dfrac{64}{x}$,

where x is the number of units of output produced and sold and p is the price
unit.

    a) Find the output level at which average cost is equal to the marginal cost.

    b) Find the output level and price at which profit is maximum.

    c) Find the maximum profit.

(12 Ma

[Total 25 Ma

(i) Integrate the following:

a) $\int \dfrac{x^2 e^x - 2x}{x^2} \, dx$

b) $\int x^3 \, e^{(x^4 + 2)} \, dx$

c) $\int x e^{2x} \, dx$

d) $\int \dfrac{1}{1 + e^{-x}} \, dx$

(12 marks)

(ii) Evaluate the following definite integrals:

a) $\int\limits_0^1 \dfrac{x}{x^2 + 1} \, dx$

b) $\int\limits_0^1 e^x - \dfrac{1}{e^x} \, dx$

(08 marks)

(iii) The marginal revenue function for a product is given by $M R = \dfrac{6}{(x-3)^2} - 4,$

Where x is the quantity produced. Find the total revenue function and the demand function.

(05 marks)

[Total 25 Marks]

3