**EASTERN UNIVERSITY, SRI LANKA**
**FACULTY OF COMMERCE AND MANAGEMENT**
**FIRST YEAR SECOND SEMESTER EXAMINATION IN**
**BACHELOR OF BUSINESS ADMINISTRATION/ BACHELOR OF COMMERCE**
**2016/2017(JANUARY 2019) – PROPER / REPEAT**
**COM 1032 BASIC CALCULUS**

**All Questions** **Time: 02 Hours**

i) If $g(x)=4(x+5)$ and $h(x)=\sqrt{x-1}$ then find $g(-1)+h(10)$.

**(03 marks)**

ii) If $f(x)=x^2$ and $g(x)=x+2$ then find, $g(x+1)$ and $f(g(x+1))$.

**(06 marks)**

iii) The number of worker-hours required to distribute new telephone books to $p\%$ of the households in a certain area is given by $t(p)=\dfrac{400p}{200-p}$.

a) What is the domain of the function, $t$?

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

c) How many worker-hours required to distribute new telephone books to the first 40 % of the households?

d) What percentage of the households in the community had received new telephone books by the 100 worker-hours had been expanded?

**(08 marks)**

5) Evaluate the following limits:

a) $\lim_{x\to 1} (\sqrt{x+8})^3$

b) $\lim_{x\to -1} \dfrac{x^2-1}{x+1}$

c) $\lim_{x\to \alpha} \dfrac{4x^3+2x^2+1}{3x^3-x+1}$

**(08 marks)**

**[ Total 25 Marks]**

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

a) $f(x)=\frac{x^2+3}{2x+1}$ b) $f(x) = 9(x+4)^3(x^3-2x)$

c) $f(x) = \ln(e^{x+1})$

(15

(ii) Find the third derivative of the function, $f(x)=(x^3+1)^2$ and evaluate it at $x=2$.

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

(05

[Total 25

03. (i) Find and classify all the critical points for the function $f(x) = 5x^4-40x^3+5$.

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

$p=\frac{80000-x}{400}$ and $C(x)=\frac{x^2}{100}+100x+64$, where $x$ is the number of units of produced and sold and $p$ is the price per unit.

a) Find the average cost function and marginal cost function.

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

c) Find the profit function.

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

e) Find the maximum profit.

(15

[Total 25

(i) Integrate the following:

a) $\int (x+2)(x^2-1)\,dx$ b) $\int \frac{x^4+5x^3-1}{x}dx$ c) $\int xe^{2x}\,dx$

**(12 marks)**

(ii) Evaluate the following definite integrals:

a) $\int_1^2 \frac{x^2}{x^3+1}\,dx$ b) $\int_0^1 e^x - \frac{1}{e^x}\,dx$

**(08 marks)**

(iii) The marginal revenue function for a product is given by $MR = \frac{6}{(x-3)^2} - 4$, where $x$, the quantity produced. Find the total revenue function and the demand function.

**(05 marks)**

**[Total 25 Marks]**