



EASTERN UNIVERSITY, SRI LANKA

DEPARTMENT OF MATHEMATICS

EXTERNAL DEGREE EXAMINATION IN SCIENCE (2008/2009)

FIRST YEAR FIRST SEMESTER (Mar./ May, 2016)

EXTCC 103 - BIO MATHEMATICS

Re-repeat

Answer all questions

Time: One hour

1. (a) Simplify the following:

i. $\left(\frac{27}{8}\right)^{-2/3} \times \frac{9}{4} \div \left(\frac{121}{256}\right)^{1/2}$;

ii. $\frac{15x^{-2}y^{-4}}{(2y^5)^{-2}x^8}$.

(b) Factorize the following:

i. $10x^2 - 17x + 3$;

ii. $x^3 - 3x^2y + 3xy^2 - y^3$.

(c) Solve the following equations:

i. $4^y - 6 \times 2^y - 16 = 0$;

ii. $3 - x - 2x^2 = 0$.

(d) If $a^2 + b^2 = 11ab$ then, prove that

$$2 \log \left[\frac{a-b}{3} \right] = \log a + \log b.$$

2. (a) Differentiate the following with respect to x .

i. $y = e^x \tan x$.

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

iii. $y = x^2 - 3x + 2$.

(b) Evaluate the following:

i. $\lim_{x \rightarrow 0} \left(\frac{\sqrt{1+x} - 1}{x} \right)$;

ii. $\lim_{x \rightarrow \infty} \left(\frac{12x^4 + 15x^3 + 9}{6x^4 + 9x} \right)$;

iii. $\lim_{x \rightarrow 3} \frac{x^2 - 3x}{x^2 - 9}$.

(c) Integrate the following:

i. $\int \frac{2x}{x^2 + 5} dx$;

ii. $\int x e^x dx$.

(d) Find the turning point of the function $y = x^3 - 3x^2 + 5$, and comment on the points.