



EASTERN UNIVERSITY, SRI LANKA
FIRST EXAMINATION IN SCIENCE - 2005/2006
SECOND SEMESTER (Mar./ Apr., 2008)
CC 103 - BIO MATHEMATICS

Repeat

Answer all questions

Time : 02 hours

1. (a) Simplify each of the following:

i. $(0.16)^{1/2} \times \left(\frac{16}{25}\right)^{5/2} \times (125)^{1/3}$,

ii. $\frac{\sqrt[4]{16x^{-8}y^4}}{\sqrt{x^{-4}y^2 + x^{-2}y}}$,

iii. $(a^{1/3} - 1)(a^{2/3} + a^{1/3} + 1)$.

(b) Solve the following equations:

i. $10(2x + 1)^{-2} - 7(2x + 1)^{-1} + 1 = 0$,

ii. $3^{x-x^2} = \frac{1}{9^x}$.

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

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

(d) Factorize the following:

i. $a^2x^2 - 4ax - 21$,

ii. $(x-2)^2 + (2x-4)(x-6)$.

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

i. $y = e^x(\sin 3x - 3 \cos 3x)$,

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

(b) If $x = \frac{t}{1+t}$ and $y = \frac{t^3}{1+t}$ then prove that $\frac{dy}{dx} = t^2(2t + 3)$.

(c) Integrate the following function with respect to x :

i. $\int \frac{\ln x}{x \sqrt{(\ln x)^2 + 2}} dx$,

ii. $\int x^2 \sin x dx$.

(d) Evaluate $\int_0^1 \frac{x}{\sqrt{1-x^2}} dx$.