EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE (2002/03 & 2002/03(A))

SECOND SEMESTER

April/May 2004

CC 103 - BIO MATHEMATICS & BIO STATISTICS

Answer all questions   Time: Two hours

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1. (a) Simplify each of the following:

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

    ii. $\dfrac{xy^2}{(x^3y)^8} \div \dfrac{x}{y^3}$,

    iii. $\dfrac{(a^{-2/3})^2}{x^{-1}a} \div \sqrt[3]{\dfrac{a^{-1}}{x^{-2}}}$.

    (b) Factorize the following:

    i. $(3u + 2v)^3 - \omega^3$,

    ii. $6x^2 - 11xy + 3y^2$.

    (c) Solve the following equations:

    i. $4^x + 4^{2-x} - 17 = 0$,

    ii. $3\ln x^2 - \dfrac{1}{2}\ln x^8 = 2 + \dfrac{1}{2}\ln x^2$.

    (d) i. Prove that $\log_a b \times \log_b c = \log_a c$,

    ii. If $\log_q p = 2a$, $\log_r q = 2b$ and $\log_p r = 2c$, then
    prove that $abc = 1/8$.

2. (a) Find the value of the following;

    i. $\lim\limits_{x \to 0} \left(\dfrac{1 - \sqrt{1 - x^2}}{x^2} \right),$

    ii. $\lim\limits_{x \to \infty} \left(\dfrac{1 - x^3}{1 + x + 2x^3} \right).$

(b) Differentiate the following with respect to x:

    i. $y = \ln \left(\dfrac{x^2 + 1}{x^2 - 1} \right),$

    ii. $y = e^x \tan x,$

    iii. $y = x^2 (\log x)^3.$

(c) Integrate the following:

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

    ii. $\displaystyle\int x^2 e^x dx,$

(d) Evaluate $\displaystyle\int_0^1 (x^2 + x)^2 dx.$

(e) Find the equation of the straight line which passes through the point $(0, 1)$ and parallel to the line $3x + 4y = 0$.

3. "Presentation of data assists easy understanding in biology". Explain how to present the data in relation to bio-statistics.

4. Distinguish between the following, within each pair;

(a) Population and Sample,

(b) Correlation and Regression.

(c) Binomial distribution and Poission distribution

(d) Standard deviation and Variance