



EASTERN UNIVERSITY, SRI LANKA
DEPARTMENT OF MATHEMATICS
FIRST EXAMINATION IN SCIENCE(2016/2017)
FIRST SEMESTER (Aug./Sept., 2018)
CC 103 - BIO MATHEMATICS

Answer all questions

Time: One hour

1. (a) Simplify the following:

i. $\frac{(-a^4b)^3(ab)^5}{-a^8b^8}$;

ii. $\left(\frac{2a^7b^{-4}}{8a^9b^{-2}}\right)^{-3} \times (-6a^{-1}b^0)^{-2}$.

(b) Solve the following equations:

i. $3^{2x} - 4 \times 3^{x+1} + 3^3 = 0$;

ii. $y = 2 \log 30 + 4 \log 2 - 2 \log 12$.

(c) If $x^2 + 9y^2 = 15xy$ then prove that $2 \log \left(\frac{x-3y}{3}\right) = \log x + \log y$.

(d) Find the equation of a straight line that passing through $\left(\frac{5}{3}, 2\right)$ and parallel to the straight line $y = \frac{7}{2}x - 3$.

(50 Marks)

2. (a) Evaluate the following limits:

i. $\lim_{x \rightarrow \infty} \left(\frac{1 - 5x^2 + 7x^3 - 49x^5}{2 + x + 7x^5} \right);$

ii. $\lim_{x \rightarrow 0} \left(\frac{x^2 - 3}{x - \sqrt{3}} \right);$

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

(b) Differentiate the following with respect to x :

i. $y = x^5 - 3x^2 = 7;$

ii. $y = e^{2x} \sin 3x;$

iii. $y = \frac{x^2 - 2}{x - 1}.$

(c) Integrate the following:

i. $\int \frac{1}{x \ln x} dx;$

ii. $\int \frac{x}{\sqrt{3x^2 - 1}} dx.$

(d) Find the maximum and minimum points of a function $y = x^3 - 6x^2 + 9x - 2.$

(50 Ma