



EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE

SECOND SEMESTER

EXTERNAL DEGREE

EXTCC 103 - BIO STATISTICS & BIO MATHEMATICS

Answer all questions

Time: 2 hour

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1. (a) Simplify the following:

i. $\left(\frac{8a^{-1}}{2^2a^2b^0}\right)^{-2} \times \left(\frac{8a^3}{b^3c^{-3}}\right)^{1/3} \times \left(\frac{c^{-1}}{ba^{-2}}\right)^3$,

ii. $\log 44 + \log \sqrt{275} - \log 11$.

(b) Factorize the following:

i. $xy + 3y - 2x - 6$,

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

(c) Solve the following equations.

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

ii. $\log_2 8 + 2 \log_4 16 = 3 \log_3 x + 6$.

(d) i. If $a^2 + b^2 = 11ab$ then show that $2 \log \left(\frac{a-b}{3}\right) = \log a + \log b$.

ii. Find the equation of straight line passing through the points (1, -3) and (3, 7).

2. (a) Find the limit value of the following:

i. $\lim_{x \rightarrow \infty} \frac{x^2 + 3x}{2x^2 + 5}$,

ii. $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{\sqrt{4+x} - 2}$.

(b) Differentiate the following with respect to x .

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

ii. $y = (1 + e^x)^3$.

(c) Integrate the following:

i. $\int \sqrt{x^2 + 2x} (x + 1) dx$,

ii. $\int \frac{1 + x \ln x}{x} dx$.

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

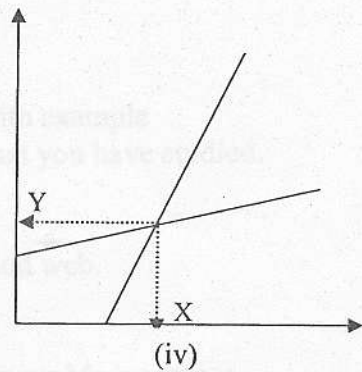
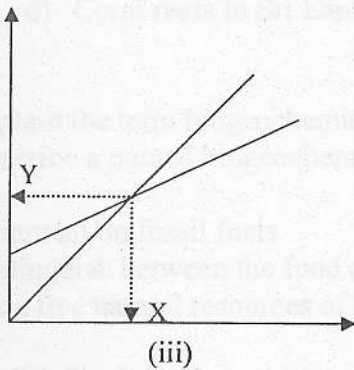
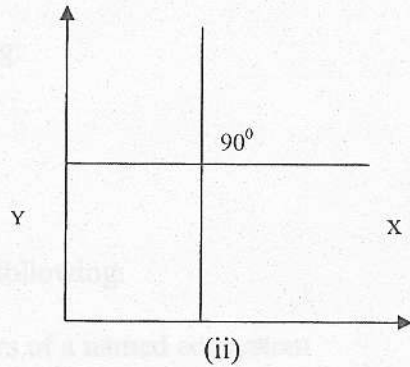
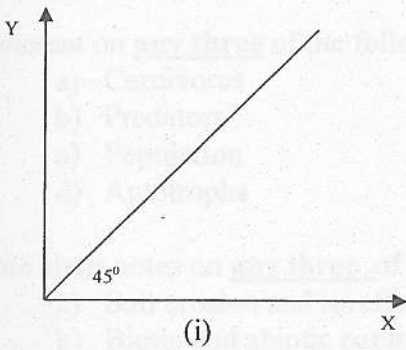
3. (a) Fifteen persons representing to a Red Cross center one day are typed for blood, and the following counts are found

Blood group:	O	A	B	AB	Total
No. of persons / :	3	5	6	1	15

If one person is randomly selected, what is the probability that this person's blood group is

- (i) AB (ii) Either A or B (iii) Not O

(b) Comment on the following regression lines



4. (a) Summarize your knowledge about the following in relation to biostatistics with examples, if necessary.

- (i) Null hypothesis
 (ii) Diagrammatic representation
 (iii) Normal distribution

(b) Chemical compositions of four plant species are given below. Draw a percentage Bar diagram and Pie diagram. Interpret the data using one of the diagrams.

Plant species	Water (g)	Carbohydrate (g)	Protein (g)	Fat (g)	Total weight (g)
Castor	3	2	3	17	25
Pea	8	6	24	2	40
Wheat	4	14	5	2	25
Soy bean	4	6	24	6	40