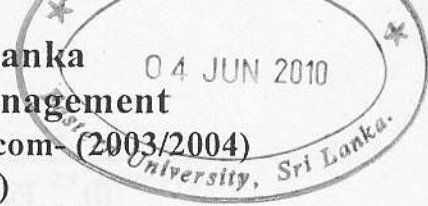


Eastern University, Sri Lanka
Faculty of Commerce and Management
Special Repeat Examination in BBA/ Bcom- (2003/2004)
February/ March (2010)
Com 1024 Mathematics and Statistics



Answer all questions

Time: 03 Hours.

01) a. Simplify the following expressions.

(i) $\frac{y^4x^3 - y^2x^4}{x^4y^4 + x^5y^5}$

(ii) $\frac{1}{x-3} + \frac{4}{x^2-2x-3} - \frac{6}{x^2-3x}$

b. Completely factorize the following

(i) $3x^2y - 3xy - 6y$

(ii) $x^6 + 8y^6$

c. Solve the following equations.

(i) $\frac{3x}{5} + 3 = 2(x - 2)$

(ii) $5x+3y=32; 4x+4y=32$

d. The manufacturer of a certain product can sell all units at a price of Rs. 20 each. It costs him Rs. 12.50 to produce each item in materials and labour and he has additional overhead cost of Rs.7000 per month in order to operate the plant. Find the number of units he should produce and sell to make a profit of Rs. 5000 per month

(20 marks)

02) a. Let 'L' be the line passing through the points of (-2, 2), (2, 10). Find the following

(i) The slope of this line

(ii) The equation of the line

(iii) The Y- intercept point and X- intercept point of this line

(iv) The intersection point of this line with the line of $2X+y = 14$

b. A man who hires the vehicle from one of the organization of X, Y and Z. The hired vehicles by him represents that the 40% of them were form X, the 50% of them were from Y and 10% of them were from Z. From the hired vehicle X, the 9% of them are delayed. Like wise, the hired vehicle from Y and Z, are delayed by 6%, 20% respectively. Draw tree diagram.

- (i) Find the probability that the hired vehicle by him being from X and reach on time (Not delay)
- (ii) Find the probability that the hired vehicle by him being delay
- (iii) Find the probability that if the hired vehicle by him being from X, given that which was delayed vehicle.
- c. A government department sent two tenders for getting two independent contracts of A and B. The department has the probability of getting contract A is $\frac{1}{4}$ and contract B is $\frac{1}{3}$. Find the probability of the following.
- (i) To get both contracts
- (ii) At least one contract

(20 marks)

03. a. Define the following terms.

- (i) Matrix
- (ii) Column matrix
- (iii) Matrix inverse
- (iv) Transpose of matrix

b. (i) States the conditions to be satisfied when multiplying two matrices.

(ii) Find the inverse of the matrix if $R = \begin{pmatrix} 2 & -7 \\ 9 & -12 \end{pmatrix}$

(iii) Find the matrix of AB and BA if $A = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ $B = (1 \ 2 \ 3)$

(iv) $L = \begin{bmatrix} 2 & -4 \\ 5 & -9 \end{bmatrix}$ $M = \begin{bmatrix} 3 & -4 \\ -6 & 5 \end{bmatrix}$ $N = \begin{bmatrix} -5 & 9 \\ 6 & 8 \end{bmatrix}$

Find the following.

a. $R = L + 2M + 2N$

b. $Y = M(L - N)$

c. Solve the following linear equations using inversion of matrix algebra method

$$3x + y - z = 6$$

$$2x + 2y + 3z = 45$$

$$x - 2y + 2z = 9$$

(20 marks)

04. a. Evaluate the limits of the following.

$$(i) \lim_{x \rightarrow 2} \frac{4-x^2}{3-\sqrt{x^2+5}} \quad (ii) \lim_{x \rightarrow \infty} \frac{3x^7+x^4+x^2+3x+10}{2x^7+6x^5+12}$$

b. Differentiate the following functions with respect to x.

$$(i) y = (4x+1)(2x^2+5)^3 \quad (ii) y = \frac{(2x+3)}{(7x+2)}$$

c. Integrate the following functions with respect to x.

$$(i) \int \frac{6x^4+3x^2+x+2}{x^2} dx \quad (ii) \int (3x^2+4)^2 dx$$

d. An firm's total revenue is given by the function of $R(x) = 4000x - 33x^2$ and total cost is given by the function of $C(x) = 2x^3 - 3x^2 + 400x + 5000$, where, x represents the number of products produced and sold by the firm. Find the following

- (i) The average cost function
- (ii) The profit function
- (iii) The output which will maximize the profit function
- (iv) Based on the output level result in (iii), total revenue, total cost and total profit

(20 marks)

05. a. The following table shows the details of salary received by the employees of two garment factories in 2006.

Factory	Average monthly income(Rs)	Standard Deviation
A	3375	34
B	3765	78

- (i) Find the coefficient of variation in monthly income of the employees of two garment factories.
- (ii) Based on the above information, describe which factory's employee's income is more consistent.

b. The following information shows the details of wheat flour sales over the last 100 days in a sales centre.

Weight of wheat flour (Kgs)	0-20	20-40	40-60	60-80	80-100
No. of days sold (frequency)	11	18	16	30	25

- (i) a. Draw histogram and frequency polygon for this distribution.
- b. Determine the mode of this distribution using this histogram
- (ii) Calculate the following.
 - i. Mean
 - ii. Median
 - iii. Standard Deviation
 - iv. Skewness
- iii. Interpret the skewness of this distribution.

(20 marks)