



University of Kelaniya – Sri Lanka

External Examinations Branch

Faculty of Commerce and Management

Bachelor of Commerce (Special) Degree First Examination – (External) 2009 October/ November 2010

BCOM E 1045 – Mathematics for Business

No. of questions: Seven (07)

Time: 03 hours

Answer any five (05) questions.

You are allowed to use calculators.

01. i. Find the factors of the following expressions.

(a) $x^2 + 2x^2 - x - 2$

(b) $64 - 4x^2$

(c) $a^3 + b^3$

(06 marks)

ii. Find the values, using the knowledge of factors.

(a) $8 - 1$

(b) $100 - 8^2$

(04 marks)

iii. If $a = 3x + \frac{2}{3}x$ and $b = 3x - \frac{2}{3}x$ show that,
 $a^2 - b^2 = 8$

(04 marks)

iv. Expand the following binomial expressions.

(a) $(a - b)^4$

(b) $(p + 2q)^3$

(06 marks)

(Total 20 marks)

02. i. Simplify the following using the rules of exponents, and show them as positive exponents.

a.

$$\sqrt{a^4 \sqrt[3]{\frac{a^6 b^{-4}}{c^9}}}$$

b. $\left[\frac{x^3}{y^4} \right]^3 \div \left[\frac{y^{-3}}{x^2} \right]^{-4}$ (06 marks)

ii. Find the value of x, using the rules of exponents.

(a) $8^x 2^x = 64$

(b) $9^x = 3$

(04 marks)

iii. Find the value using logarithms.

$$\frac{31.52 \times \sqrt{0.5147}}{(1.94)^3}$$

(04 marks)

iv. Find the value of x, without using logarithms.

(a) $x = \frac{\log 15 + 2 \log 6 - \log 5 - 4 \log 2 - \log 3}{\log 3 - \log 2}$

(b) $3 \log x = \log 5 + \log 25$

(06 marks)

(Total 20 marks)

03. i. Solve the following equation system.

$$2x + 3y = 5$$

$$xy = 1$$

(05 marks)

ii. There two numbers. When $\frac{1}{2}$ of the small number is reduced from $\frac{1}{3}$ of the large number, the difference is one. When $\frac{1}{5}$ of the large number is added to the $\frac{1}{6}$ of the small number, it equals to $\frac{1}{2}$ of the small. Find the two numbers.

(05 marks)

iii. Find the sum of all integers between 42 and 202 which are exactly divisible by 4.

(04 marks)

iv. 3rd term and the 6th term of a geometric progression are 27 and 8 respectively. Find the sum of first 6 terms.

(06 marks)

(Total 20 marks)

04. i. If $n(A) = 63$, $n(B) = 46$ and $n(A \cap B) = 98$

Find,

(a) $n(A \cap B)$

(b) $n(B - A)$

(05 marks)

ii. The following information were gathered from an investigation, conducted on 100 farmers in a small village.

No. of farmers	Type of Cultivation
56	Paddy
48	Vegetables
45	Fruits
18	Both vegetables and fruits
32	Paddy and fruits
12	All three
12	None

a) Present the above information in a Venne diagram.

b) Find the number of farmers who cultivate only paddy and vegetables.

(05 marks)

iii. Find out the number of different words which can be arranged by using the letters of the following words.

a) STATISTICS

b) ACCOUNTING

(04 marks)

iv. There are 12 clerks in an office and five are males. Out of them you want to select a team of five members randomly. Find the number of ways in which a team could be formed.

a) Including only female clerks

b) Including at least one male clerk.

(06 marks)

(Total 20 marks)

05. i. Suppose you deposit Rs. 50,000 at the end of each year in your savings account that pays 6% interest compounded semi-annually.

How much will you have in the account at the end of the 10 year period.

(05 marks)

ii. If, $A = \begin{bmatrix} 4 & 2 \\ 0 & 1 \end{bmatrix}$ $B = \begin{bmatrix} -8 & 1 \\ 1 & 2 \end{bmatrix}$ $C = \begin{bmatrix} 9 & 0 & 1 \\ 1 & 5 & 8 \end{bmatrix}$

Find,

a. $B - A$

b. A/B

c. AC

d. B/C

(08 marks)

iii. Solve the following equations, using Cramer's Rule.

$$4a + 3b = 28$$

$$2a + 5b = 42$$

(07 marks)

(Total 20 marks)

05. i. Find the limits for the following functions.

(a) $\lim_{x \rightarrow 4} \frac{3x^2 - 5x}{x + 6}$

(b) $\lim_{x \rightarrow 7} \frac{x - 7}{x^2 - 49}$

(c) $\lim_{x \rightarrow \infty} \left[\frac{4x - 3 + x^3}{8x^4 - 5x^2 + 7} \right]$

(06 marks)

ii. Consider the following function.

$$f(x) = 2x^3 - 30x^2 + 126x + 59$$

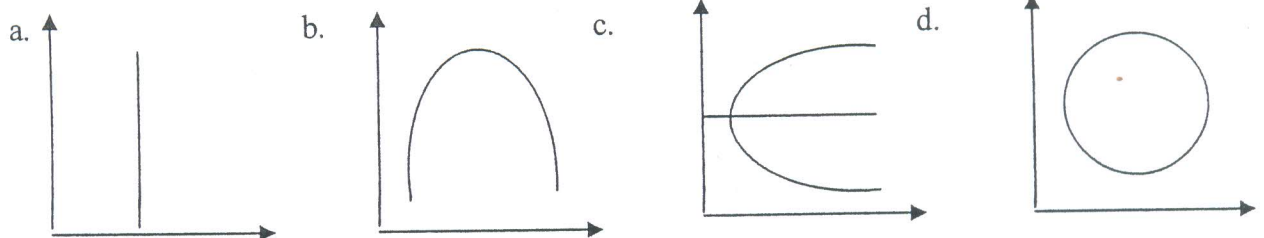
a) Find the critical values.

b) Determine whether the function is at a relative maximum or minimum at the critical values.

(06 marks)

iii. Which of the following graphs are the graphs of functions and why.

(Hint: Use the vertical line test)



(08 marks)

07. i. Differentiate the following functions.

a. $Y = (4x^2 - 3)(2x^5)$

b. $Y = \frac{6x - 7}{8x - 5}$

c. $Y = (5x - 1)(3x + 4)^3$

(06 marks)

ii. Integrate the following expressions.

a. $\int dx$

b. $\int (5x^3 + 2x^2 + 3x) dx$

c. $\int \sqrt{x} dx$

(06 marks)

iii. Evaluate the following definite integrals.

a. $\int_1^{64} x^{-2/3} dx$

b. $\int_1^3 (x^3 + x + 6) dx$

(04 marks)

iv. Consider the following function.

$$f(x) = 4x^3 + 3x^2 + 5x - 2$$

a) Find all the successive derivatives.

b) Evaluate them at $x = 1$.

(04 marks)

(Total 20 marks)