



UNIVERSITY OF KELANIYA – SRI LANKA

Centre for Distance and Continuing Education

FACULTY OF COMMERCE & MANAGEMENT STUDIES

Bachelor of Commerce (Special) Degree First Year Examination (External) – 2014

June/ July 2019

BCOM E1045 – Mathematics for Business

No. of questions: Seven (07)

Time: 03 hours

Answer for any five (05) questions.

Question No. 01

a). Write the following values in words.

- i). 321,456
- ii). 78,652,028
- iii). 17,000,017,000
- iv). 789,546,002
- v). 895,468,050,000

(05 Marks)

b).

i). Simplify,

1. $\frac{6ab}{3ab} - \frac{3a^2}{3ab} + \frac{9ab^2}{3ab}$

2. $\frac{2x^{-3}y^4z^{-2}}{3x^4y^2z^3}$

3. $\frac{(d^4)}{(d^6)} \left[\frac{(d^4)^{-3}}{(d^6)^{-2}} \right] \left[\frac{d^4}{d^6} \right]^{-8}$

(06 Marks)

ii). In 2011, Colombo progressive income tax rates were 10.8% on the first Rs:31,000, 12.75% on the next Rs: 36,000, and 17.4% on any additional income. If the some persons' your gross taxable earnings for the year were Rs: 125,000, what percentage earnings should by as taxes?

(03 Marks)

c). Factorize following expression.

i). $\frac{a^2-16}{a^2-25} \div \frac{a^2-2a-8}{a^2-10a+25}$

ii). $x^2 - 9x - 36$

iii). $3x^2 + 21x + 36$

(06 Marks)
(Total Marks 20)

Question No. 02

a). Solve the following simultaneous equations.

i). $x - 3y = 1$

$$2x + 5y = 35$$

ii). $3x + 2y - 2p = -5$

$$4x + 3y + 3p = 17$$

$$2x - y + p = -1$$

iii). $2a + 3b - c = 13$

$$4a + 8b + 2c = 74$$

$$a - 2b + 5c = 35$$

(06 Marks)

b). Find the values of the following quadratic equations by using the knowledge of equations.

i). $4x^2 + 9 = 12x$

ii). $x^2 - 5x + 6 = 0$

iii). $2x^2 + 3x - 2 = 0$

(09 Marks)

c). Simplify the following equation without using log tables or calculators:

$$\log_6(216) + [\log(42) - \log(6)] / \log(49)$$

If $\log_2 8 + \log_5(1/25) + \log_9 3 = \log_{16} x$ find the values of x.

(05 Marks)
(Total Marks 20)

Question No. 03

- a). A firm makes two goods A and B which require two inputs K and L. One unit of A requires 6 units of K plus 3 units of L and one unit of B requires 4 units of K plus 5 units of L. If the firm has 420 units of K and 300 units of L how much of A and B can be produced using K and L?

(06 Marks)

- b). A certain economy has following demand and supply functions,

$$Qd = \frac{1}{2} - 12p \quad , \quad Qs = \frac{3}{20} + 9p$$

Find the equilibrium price & quantity of this equation.

(06 Marks)

- c). Draw the graph for the following function by substituting -2, -1, 0, 1, 2, 3, 4, 5 values for the "x".

$$Y = x^2 - 4x + 3$$

(08 Marks)

(Total Marks 20)

Question No 04

- a). Using arithmetic series knowledge solve the following problems.

- i). If the first 3 terms in an arithmetic progression are 10,7,4 then what is the 16th term?
- ii). The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and the 10th terms is 44. Find the first three terms of the series.
- iii). 20 years old Suboda started work in 1995 at a monthly salary of Rs. 5000 and received an increment of Rs. 200 for monthly salary in each year. In which year his annual salary double? Assume that he worked same place until his retirement in 60, how much total amount he will be received as a salary?

(10 Marks)

- b). By using the knowledge of geometric series solve the following problems.

- i). Find common ratio for the geometric progression whose first three terms are 2, 4, 8...

ii). Population projections are an important aspect of governmental planning. In 1990 the population of Canada was 26.6 million. The population in 2025 is predicted to be 38.4 million. If this prediction were based on a geometric sequence, what would be the annual growth rate?

iii). Two computer companies named A and Company B, opened in 1991. The revenues of Company A & B increased as geometric series until 2000. Revenue of Company A has earn Rs: 523.7 million Company B has earn Rs: 65.6 million in 1996. If the revenues of Company A and B have a growth rate of 3% and 2% respectively, find the total revenue from 1991 to 2000 separately.

(10 Marks)

(Total Marks 20)

Question No. 05

a). Explain what is the importance of learning mathematics.

(03 marks)

b). What is the present value of receiving a single amount of Rs: 5,000 at the end of three years, if the time value of money is 8% per year, compounded quarterly?

(04 Marks)

c). Nimal invests a periodic payment of Rs: 520 into a mutual fund at the end of each quarter. If his investments earn 5.5% annual interest compounded thrice, then how long will it take to accumulate a future value of Rs: 50,000?

(05 Marks)

d). Mr. Nimal plan to invest Rs: 7,500 for three years, 8% interest rate quarterly. From fourth year all together interest and investment will be deposited at the Sampath bank for 10% monthly compound rate for 4-year period. After that time also interest and deposited amount will be invested on bills for 12% semiannual compounded rate only for 2 years. What is the future value of this plan?

(08 Marks)

(Total Marks 20)

Question No. 06

a) Find the followings using the given sets

$$U = \{d, e, f, g, h, i, j, k, m\} \quad A = \{d, e, h, i\} \quad B = \{e, g, i, k\} \quad C = \{d, i, j, m\}$$

- i). $B' - A'$
- ii). $A' \cap B'$
- iii). $(A \cup B)'$
- iv). $A' \cup B'$
- v). $(A \cap B)'$

(05 Marks)

b). A survey of 150 economists, asked them which of three industries biomedical, software, or telecommunications respectively is going to be a profitable focus for the fund in the coming year. Seven economists have responded to the above industries positively.

113 economists gave a positive outlook to the software industry.

99 economists gave a positive outlook to the biomedical industry.

98 economists gave a positive outlook to the telecommunications industry.

79 economists gave a positive outlook to both software & biomedical.

84 economists gave a positive outlook to both software & telecommunications.

82 economists gave a positive outlook to both telecommunications & biomedical.

How many of them gave a positive outlook to all three industries.

(08 Marks)

c). From a group of 7 men and 6 women, five persons are to be selected to form a committee so that at least 3 men are there on the committee. In how many ways can it be done?

(07 Marks)

(Total Marks 20)

Question No. 07

a). Explain the following matrices with examples.

- 1. Identify matrix
- 2. Null Matrix

(05 Marks)

b). Transpose the following matrices.

i). $A = \begin{bmatrix} 5 & 1 \\ 3 & -2 \\ 6 & 3 \end{bmatrix}$

ii). $B = [-3 \ 6]$

iii). $C = \begin{bmatrix} a & 2 & b \\ -6 & 6 & d \\ 2 & 4 & c \end{bmatrix}$

(03 Marks)

e). Using A and B matrices find the followings.

$$A = \begin{bmatrix} 8 & 4 & 3 \\ 10 & 7 & -4 \\ 6 & 9 & -6 \end{bmatrix} \quad B = \begin{bmatrix} -1 & 5 & -2 \\ 6 & 3 & 7 \\ 2 & -8 & 2 \end{bmatrix}$$

i). $A + B$

(02 Marks)

ii). $A - B$

(02 Marks)

iii). AB

(04 Marks)

iv). $D = A(2B + 3C)$

(04 Marks)

(Total Marks 20)