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) – 2015

March/ April 2021

BCOM E1045 – Mathematics for Business

No. of questions: Seven (07) **Time: 03 hours**

Answer only for any five (05) questions.

Question No. 01

a) Write the following numbers in the words.

i). 421,856

ii). 89,52,028

iii). 15,000,016,000

iv). 259,546,002

v). 565,498,025,000

(05 Marks)

b) Solve the following expressions.

i). $\frac{8ab}{4ab} - \frac{4a^2}{4ab} + \frac{12ab^2}{3ab}$

ii). $\frac{6x^{-6}y^6Z^9}{2x^5y^2z^7}$

iii). $\frac{(d^9)}{(d^6)}\left[\frac{(d^8)^{-6}}{(d^2)^{-7}}\right]\left[\frac{d^2}{d^3}\right]^{-6}$

(06 Marks)

c) Area of a rectangle is 21m^2. If the perimeter of the rectangle is 20 m, find the length and width of the rectangle. (Length is greater than the width)

Area = length X width

Perimeter = 2(length + width)

(03 Marks)

d) Factorize the following expressions.

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

ii). $x^2 - 8x - 48$

iii). $2x^2 + 22x + 60$

(06 Marks)

(Total Marks 20)

Question No. 02

a) Solve the following simultaneous equations.

i). $x - 3y + 4k = 4$

$4x + 2y + k = 38$

$2x + 3y - 5k = 16$

ii). $2a + 3b - c = 17$

$4a + 8b - 2c = 46$

$a - 2b + 5c = 37$

(06 Marks)

b) Find the values of the following quadratic equations using formula.

i). $2x^2 + 21 = 23x$

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

iii). $4x^2 + 2x - 12 = 0$

(09 Marks)

c) A mall is being constructed and needs to meet the legal requirements for parking availability. Parking laws require one parking lot for every 120 square feet of retail space. The mall is designed to have 1,400,000 square feet of retail space. Of the total parking lot available, 3% need to be handicap accessible stores, there need to be three times as many small car spaces as handicap accessible store spaces, retail food court spaces need to be one-quarter of the number of small car spaces, and the rest of the spaces are for regular stalls. How many of each type of parking space does the mall require?

(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 5 units of K plus 2 units of L and one unit of B requires 6 units of K plus 7 units of L. The firm has 450 units of K and 340 units of L at its disposal. How much of A and B should it produce if it wishes to exhaust its supplies of K and L totally?

(06 Marks)

b) Solve the following equation:

$$FV_{ORD} = PMT(1+\Delta\%)^{N-1}\left[\frac{\left[\frac{CY}{(1+i)\overline{PY}}\right]^{N}-1}{\frac{CY}{(1+i)\overline{PY}}-1}\right]$$

Where,

PMT = Rs: 600, I = 0.06, Δ% = 0.03, CY = 3, PY = 6 and N = 20

(06 Marks)

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

$$Y = x^2 - 8x + 7$$

(08 Marks)

(Total Marks 20)

Question No. 04

a). Using arithmetic series knowledge solve following problems.

i). If the first 3 terms in an arithmetic progression are 8,15,22 then what is the 17th term?

ii). A Sunil arranges to pay a debt of Rs.360,000 in 40 monthly instalments which are in a AP. When 30 instalments are paid he dies leaving one third of the debt unpaid. Find the value of the first instalment.

iii). 20 years old Ranjith started work in 1990 at a monthly salary of Rs. 6000 and received an increment of Rs. 300 for monthly salary in each year. In which year did he double his annual salary? Assume that he worked same place until his retirement in 60, find how much total amount he will be received as a salary?

(10 Marks)

b). Using geometric series knowledge solve the following problems.

i). Find common ratio for the geometric progression whose first three terms are 12, 36, 108...

ii). Population projections are an important aspect of governmental planning. In 1990 the population of Canada was 26.6 million. The population in 2035 is predicted to be 48.4 million. If this prediction were based on a geometric sequence, what would the annual growth rate be?

iii). Management trainee working with a company commenced on an annual salary of Rs: 228,000 and has received a 10% increase each year.

1. How much did he earn in his 5th year of employment?
2. If a company offer promotion after his fifteen years' service with increasing salary increasing rate up to 12%, find how much has he earned from the company altogether in 20 years?

(10 Marks)

(Total Marks 20)

Question No. 05

a) Describe practical importance of Mathematics by using three examples.

(03 Marks)

b) What is the present value of receiving a single amount of Rs: 9,000 at the end of three years, if the time value of money is 6% per year, compounded quarterly?

(04 Marks)

c) Susil invests a periodic payment of Rs: 6,200 into a mutual fund at the end of each quarter. If his investments earn 6.5% annual interest compounded thrice, then how long will it take to accumulate a future value of Rs: 48,000?

(05 Marks)

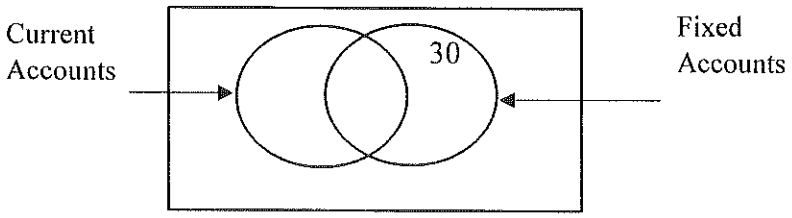
d) Mr. Kamal plan to invest in XYZ bank Rs: 25,500 for three years, 3% interest rate quarterly. Form the fourth year all together interest and investment will be deposited at the ABC Bank for 1.6% monthly compound rate for 3-year period. After that time also interest and deposited amount will be invested in LMN bank for 6.2% semiannual compounded rate only for 3 years. What is the future value of this plan??

(08 Marks)

(Total Marks 20)

Question No. 06

a). Following Venn - diagram is given the information about accounts details of 100 retirees.



i). Describe in words, the subset in which there are 30 elements, according to the diagram.

(04 marks)

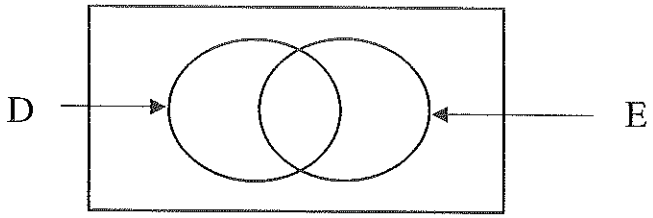
ii). If the number of those who maintain current accounts is 40, then what is the number of those who maintain both fixed deposit accounts and current accounts?

(02 marks)

iii). If the number of those who maintain fixed deposit accounts is 65, then what is the number of those who do not maintain any of the given three types of accounts.

(02 marks)

b). Shade the region $(D \cap E)'$ of the following diagram.



(02 marks)

c). State the following sets by using the knowledge of the set builder notation.

i). All the real numbers greater than 10

ii). Citizen who registered to vote in Galle District

(04 marks)

d). Explain what "Finite sets" are. Provide two examples.

(03 marks)

e). Write down the law of distributions in sets operation.

(03 marks)

(Total 20 marks)

Question No. 07

a). Express the following linear-equation system in matrix form.

i). $3x_1 + 2x_2 + x_3 = 11$

ii). $4x_1 + x_2 + 2_3 = 6$

iii). $2/5\, x_1 + 2x_2 - x_3 = 10$

(04 marks)

b). Explain the following matrices with examples.

i). Identify matrix

ii). Square Matrix

(04 marks)

c). Find the transposes and determinants of the following matrices.

$$A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix} \quad (2 \times 2) \qquad B = \begin{bmatrix} 1 & 0 & 9 \\ 6 & 1 & 1 \\ 4 & 0 & 2 \end{bmatrix} \quad (3 \times 3)$$

(06 marks)

d). If you are given the following matrices.

$$A = \begin{bmatrix} 8 & 1 & 6 \\ 4 & 0 & 1 \\ 6 & 0 & 3 \end{bmatrix} \quad (3 \times 3) \qquad B = \begin{bmatrix} 2 & 0 & 9 \\ 6 & 0 & 3 \\ 7 & 2 & 1 \end{bmatrix} \quad (3 \times 3) \qquad C = \begin{bmatrix} 0 & 1 & 3 \\ 2 & 5 & 7 \\ 3 & 1 & 0 \end{bmatrix} \quad (3 \times 3)$$

Find

i). $A + B$

ii). $A - C$

iii). AC

iv). $4B$

(06 marks)

(Total 20 marks)