



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) – 2016

May 2022

BCOM E1045 – Mathematics for Business

No. of questions: Six (06)

Time: 03 hours

Answer only five (05) Questions

Question No. 01

a). Simplify the following algebraic expression;

i. $(5a + 7c) - \{(4a + 3c^2) + 10(a + c)\}$

ii. $-(3ab)(a^2 + 4b - 2a) - 4(8a + 6)$

(05 Marks)

b). Assume in 2023, Sri Lankan progressive income tax rates will be 9.8% on the first Rs: 65,000, 12.75% on the next Rs: 60,000, and 17.4% on any additional income. If your gross taxable earnings for the year will be Rs:175,000, what percentage of your earnings will you be pay in taxes?

(05 Marks)

c). Simplify the following exponential fractional expression;

i. $(3x^2y^{-5})(-6x^{-5}y^3)(\frac{1}{12}x^{-1}y^6)$

ii. $\left[\frac{(d^4)^{-9}}{(d^6)^{-8}}\right] \div \left[\frac{(d^4)}{(d^9)}\right]^{-8}$

(05 Marks)

d). Simplify the following using factorization knowledge.

i. $3a^2 - 39a + 120$

ii. $\frac{x^2 - 4}{x^2 - 7x + 10} \div \frac{x^2 - x - 6}{x^2 - 3x - 10}$

(05 Marks)

(Total 20 Marks)

Question No. 02

a). Solve following equations.

i. $\frac{2x+7}{3} = \frac{x-4}{6} + \frac{1}{2}$

ii. $(x+2)^2 + (2x-1)^2 = 5x(x+1)$

(05 Marks)

b). Jacob owns Rs: 18,000 shares in a corporation, which represents 2% of all issued shares for the company. He sold $\frac{2}{5}$ of his shares to another investor for Rs: 7,800. What is the total value for all of the shares issued by the company?

(05 Marks)

c). A firm makes two goods A and B which require two inputs K (Capital) and L (Labour). 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. The firm has 420 units of K and 300 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?

(05 Marks)

d). Solve the following simultaneous equations.

i. $3a + 2b - 2c = -5$

$$4a + 3b + 3c = 17$$

$$2c - b + c = -1$$

ii. $12g - 2h + 5k = 71$

$$5g + 3h + 2k = 48$$

$$6g - 4h + 6k = 52$$

(05 Marks)

(Total 20 Marks)

Question No. 03

a). If A is a set $A = \{3, 6, 9, 10, 13, 18\}$. State whether the following statements are 'true' or 'false':

(i) $9 \in A$

(ii) $12 \notin A$

(iii) $13 \in A$

(iv) $11, 12 \in A$

(v) $12, 14, 15 \in A$

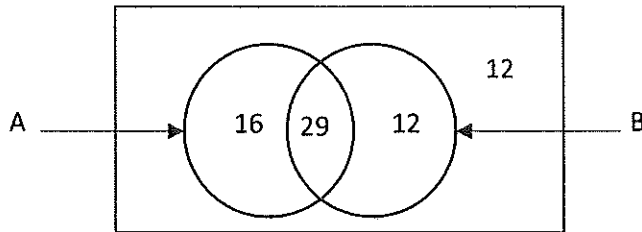
(05 Marks)

b). Using the given Venn diagram below find,

(i) Find $n(A)$

(ii) Find $n(A \cap B)$

(iii) Write $(A \cup B)'$



(03 Marks)

c). Write the set of vowels used in the word 'ACADEMIC'.

(02 Marks)

d). For each statement, given below, state whether it is true or false along with the explanations.

i). $\{9, 9, 9, 9, 9\} = \{9\}$

ii). $\{p, q, r, s, t\} = \{t, s, r, q, p\}$

(04 Marks)

e). Out of 135 students; 80 passed in English, 116 passed in Mathematics, 95 in Science, 70 in English and Mathematics, 85 in Mathematics and Science; 50 in English and Science and 45 in all three subjects. Find how many passed.

i). In English and Mathematics but not in Science

ii). In Mathematics and Science but not in English

iii). In Mathematics only

iv). In more than one subject only?

(06 Marks)

(Total 20 Marks)

Question Number 04

a). What is meant by a matrix?

(02 Marks)

b). Give two examples in the fields that we can apply matrices practically.

(02 Marks)

c). Explain the following matrices using one example each.

i). Square Matrix

ii). Null Matrix

(04 Marks)

d). Kumudu , Ramani & Mary go to a candy store. Kumudu buys 05 toffees , 02 ice-creams and 10 jelly packets. Ramani buys 02 toffees, 04 ice-creams and 02 jelly packets. Mary buys 03 toffees, 01 ice-cream & 02 jelly packets. Write a matrix depicting these transactions. Write down the dimension of the matrix.

(03 Marks)

e). If $A = \begin{pmatrix} 3 & 5 \\ 4 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 0 \\ 4 & 7 \end{pmatrix}$ find the product of the matrices.

(04 Marks)

f). A café sells coffee , lemonade & sprite as follows (in '000 units).

Drink	First week	Second week	Third week
coffee	5	6	1
lemonade	2	3	0
sprite	7	3	0

i). Express the above-mentioned information in matrix form.

ii). Find the determinant of the above matrix.

(05 Marks)

(Total 20 Marks)

Question Number 05

a). Illustrate with an example what is meant by "permutations" as a basic principle of calculation.

(05 Marks)

b). How many numbers lying between 10 and 100 can be formed with the help of digits 3,0,4,5,6 ?

(05 Marks)

c). Find the number of permutations of the word "ACCOUNTANT".

(04 Marks)

- d). In an examination a candidate is required to answer 6 out of 10 questions which are divided into two groups each containing 05 questions and not permitted to attempt more than four questions from each group.

In how many ways , can be makeup his choice?

(06 Marks)

(Total 20 Marks)

Question Number 06

- a). A firm operates two plants whose marginal cost schedules are $MC_1 = 2 + 0.2 q_1$ and $MC_2 = 6 + 0.04 q_2$.

It is a monopoly seller in a market where the demand schedule is $P = 66 - 0.1 q$

Where q is aggregate output. How much is the firm produce in each plant, and what price should total output be sold if the firm wishes to maximize profits?

(All the prices are in Rupees Million)

(08 Marks)

- b). Find the following integrals.

a). $\int (24 + 7 \cdot 2x) dx$

b). $\int 30x^4 dx$

c). $\int 0.5x^{-0.5} dx$

d). $\int 6x^2 dx$

e). $\int_5^6 6x^0 + 5 - 3x^{-2} + 85x dx$

(12 Marks)

(Total 20 Marks)

