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# DMI-ST. EUGENE UNIVERSITY

DEGREE EXAMINATION – JUNE 2023

Semester: I

551/552MA12

BUSINESS MATHEMATICS

Time: 3:00 Hours

Max. Marks: 100

Answer any FIVE Questions (5 x 20 = 100 Marks)

1. a) In a group of 65 people, 40 like cricket, 10 like both cricket and tennis. How many like tennis only and not cricket? How many like tennis? **(10 Marks)**

b) Verify De-Morgan theorem of sets using Venn-diagram. **(10 Marks)**

2. a) Find the domain and range of the following real functions. **(10 Marks)**

(i)  $f(x) = -|x|$

(ii)  $f(x) = \sqrt{9 - x^2}$

b) If  $f(x) = 3x - 2$ ,  $g(x) = 2x + k$  and if  $o g = g o f$ , then find the value of  $k$ .

**(10 Marks)**

3. a) Find the 15<sup>th</sup>, 24<sup>th</sup> and  $n^{\text{th}}$  term (general term) of an A.P. given by 3, 15, 27, 39,...

**(10 Marks)**

b) In an A.P., sum of four consecutive terms is 28 and their sum of their squares is 276. Find the four numbers. **(10 Marks)**

4. a) Find inverse of the matrix  $A = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 2 & 1 \\ 1 & 1 & -2 \end{bmatrix}$  **(10 Marks)**

b) If the matrix  $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ ,  $B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$ ,  $C = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$  **(10 Marks)**

Find a matrix  $D$  such that  $CD - AB = O$ .

5. **(5 Marks)**

a) A person has taken a loan of K 700,000 at 16% rate of interest from a finance company. If the repayment period is of 15 years then find the installment he has to pay at the beginning of each month. **(10 Marks)**

- b) Briefly explain compounded ratio. **(10 Marks)**
6. a) Solve for  $x$ :  $\log_2 x - 3 \log_{\frac{1}{2}} x = 6$ . **(10 Marks)**
- b) Solve  $\log_{5-x}(x^2 - 6x + 65) = 2$  **(10 Marks)**
7. a) If  $5P_r = 6P_{r-1}$ , find  $r$ . **(10 Marks)**
- b) If  $15C_r : 15C_{r-1} = 11 : 5$ , find  $r$ . **(10 Marks)**