1st In Semester Examination-2023
B.Com 4th Semester
Subject: Business Mathematics (BUMT)

Full Marks: 25 *Time: 45 Min*

Answer any five questions:

1. Calculate the nominal rate of interest convertible half-yearly when the effective rate is 6% p.a. *5*
2. A person deposits Rs. 16000/- in a bank at the end of each year for 8 years. If the rate of interest is 10% p.a. compounded annually, then find the amount at the end of that period. *5*
3. Define the following : 1x*5=5*
   (a) Nominal rate of interest, (b) Effective rate of interest, (c) Annuity, (d) Perpetuity, (e) Deferred annuity.

4. (a) If $A = \begin{bmatrix} 1 & -7 \\ 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -4 & 5 \\ -2 & 1 \end{bmatrix}$, find X such that $3A - 3B + 2X = 0$. *3*
   (b) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 6 \\ 0 & -2 \end{bmatrix}$, then verify that $AB = BA$. *2*

5. Prove that: $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$ *5*

6. Find the inverse of the following matrix: *5*

$$A = \begin{bmatrix} 2 & 2 & 3 \\ 1 & -2 & 3 \\ 0 & 1 & -1 \end{bmatrix}$$

7. (a) If $f(x) = log\left(\frac{1+x}{1-x}\right)$, then show that $f(x) + f(y) = f(\frac{x+y}{1+xy})$ *3*
   (b) Find the value of *2*

$$\lim_{x \to 3} \left(\frac{x^3 - 27}{x - 3} \right)$$

8. (a) If $= f(x) = \frac{x+1}{x+2}$, then find the value of $f\left(\frac{1}{x}\right)$. *2*
   (b) Find the value of *3*

$$\lim_{x \to 2} \frac{x^2 - 3x + 2}{x^2 + x - 6}$$

9. Describe in your own words about the importance of calculus in business and commerce. *5*
10. Define odd and even function. A function if given as: *2+3=5*

$$\frac{x^4 + 2x + 11}{x^2 - 3}$$

Examine whether the given function in odd or even.

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