

**Bachelor of Commerce Examination: October - 2022  
(Distance Education) (New Course)**

Day & Date	Semester	Subject Name	Time	Code	Marks
Friday 14/10/2022	I (Fresh/ Repeater)	Business Mathematics	11.00 AM To 02.10 PM	145108	75

**Instructions: 1) Questions 8 & 9 are Compulsory.  
2) Answer any four questions from the rest.**

- Q.1** a) Solve for  $x$ :  $\begin{vmatrix} x & 1 & 2 \\ 3 & x & 3 \\ 1 & 5 & 2 \end{vmatrix} = 6$  **05**
- b) Solve the following equations by using Cramer's Rule. **05**  
 $2x + 3y = 3$   
 $3x - y = 10$
- Q.2** a) Find  $a, b, c$  if  $\begin{bmatrix} a + 2b & 2 - b \\ b + c & a - c \end{bmatrix} = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$  **03**
- b) if  $A = \begin{bmatrix} 2 & -1 & 1 \\ -2 & 3 & -2 \\ -4 & 4 & 3 \end{bmatrix}$  then show that  $A^2 = A$  **03**
- c) Find the inverse of  $\begin{bmatrix} 5 & 4 \\ 3 & 2 \end{bmatrix}$  **04**
- Q.3** a) Two numbers are in the ratio 3:5 and their total sum is 344. Find the numbers. **02**
- b) Find the commission on total sales worth ₹ 50,000 if the rate of commission is 4% on the first ₹ 20,000 and 8% on the sales over ₹ 20,000. **04**
- c) A furniture dealer deals with a chair allowing 8% trade discount and 4% cash discount and sold at price ₹ 8832. If he made 38% profit, find the cost price and the marked price of the chair? **04**
- Q.4** a) If a lender charges 12% interest compounded monthly, what is the effective interest rate per quarter? **02**
- b) Riya has two investment options to invest ₹ 5,00,000, Scheme I has a discounting factor 0.7 and Scheme II has discounting factor of 0.9. In which Scheme Riya should invest ₹ 5,00,000. **04**
- c) Find the amount accumulated after 2 years. If sum of ₹ 12000 is invested at the end of 6 months at 12% p.a. compounded half yearly. **04**
- Q.5** a) Find the accumulated value of an annuity due to ₹ 500 per annum for 3 years at 10% p.a. compounded annually. **05**
- b) Find the present value of an annuity due of ₹ 400 to be paid per quarter at 32% p.a. compounded quarterly for one year. **05**

- Q.6** Solve the following LPP **10**  
 Minimize  $z = 20x_1 + 30x_2$   
 Subject to  $x_1 + 2x_2 \geq 2$   
 $3x_1 + x_2 \geq 3$   
 $4x_1 + 3x_2 \geq 6$   
 Where  $x_1 \geq 0, x_2 \geq 0$
- Q.7** **a)** A bookshelf has space for exactly 5 books. How many different ways can 5 books be arranged on this bookshelf? **02**  
**b)** Find  $n$  if  $(n + 3)! = 110(n + 1)!$  **03**  
**c)** A committee of 12 persons is to be formed from 9 women and 8 men. In how many ways can this be done if at least five women have to be included in a committee? **05**
- Q.8** **a) Match the following:** **05**
- | <b>Column A</b> | <b>Column B</b>  |
|-----------------|------------------|
| 1) Permutation  | a) Present value |
| 2) Combination  | b) Future value  |
| 3) Compounding  | c) Arrangement   |
| 4) Discounting  | d) MRP           |
| 5) Discount     | e) Selection     |
- b) Answers in one sentence.** **05**
- 1) What is zero matrix?
  - 2) Define Ratio.
  - 3) Give types of Rates.
  - 4) Define Annuity.
  - 5) Define unbounded solution.
- Q.9** **Write shorts notes (any 5):** **25**
- a)** Give the types of matrix.
  - b)** Explain Fundamental Theorem with the help of example.
  - c)** Explain term infeasibility with the help of example.
  - d)** Explain the term Present Value and Net Present Value.
  - e)** Application of Nominal and Effective Rate
  - f)** Application of Matrices in our day to day life.
  - g)** Difference between Commission and Brokerage.