

END TERM EXAMINATION

FIRST SEMESTER (B.COM) DECEMBER-2024

Paper Code: BCOM-105

Subject: Quantitative Techniques for Commerce

Time: 3 Hours

Maximum Marks: 60

Note: Attempt any five questions as directed including Q.No.1 which is compulsory. Internal choice is indicted.

Q1 Attempt any Four of the following questions (Not exceeding 150 words): (4x5=20)

- (a) Explain various types of matrix.
- (b) What are the business applications of the inverse of the matrix
- (c) Differentiate between exponential and logarithmic functions.
- (d) Briefly write about Euler's theorem
- (e) Define definite integration
- (f) Explain the Learning Curve
- (g) Write steps in the formulation of linear programming problems
- (h) What is the economic interpretation of the dual problem?

Q2 A school has 10 teachers and 15 students. A committee of 4 people will be formed with at least 2 teachers. How many different committees can be formed? (10)

OR

Q3 The first term of an arithmetic progression is 3, and the common difference is 5. Find the 10th term and the sum of the first 10 terms. (10)

Q4 Explain the concept of a partial derivative and how it differs from a total derivative. Provide an example to illustrate your explanation. (10)

OR

Q5 Discuss the process of finding the maximum and minimum values of a function using calculus. Provide a step-by-step example of how to find the maximum or minimum value of a given function. Explain the significance of the first and second derivative tests in this process. (10)

Q6 Discuss how integration is used in marginal analysis. Explain the relationship between marginal cost, marginal revenue, and total cost or total revenue. Provide an example to illustrate the application of integration in this context. (10)

OR

Q7 Given the demand function $D(x)=10-x$ and the supply function $S(x)=2+x$, find the consumer's surplus at the equilibrium point. (10)

Q8 Maximize the objective function using the simplex method $z=4x_1+3x_2$ subject to the constraints: (10)

$$\begin{aligned} x_1+2x_2 &\leq 8 \\ 3x_1+x_2 &\leq 6 \\ x_1, x_2 &\geq 0 \end{aligned}$$

OR

Q9 (a) Write the dual of the following:- (10)

Max $Z = 7x_1 + 14x_2 + 6x_3 + 10x_4 - 3x_5$

Subject to constraints:

$x_5 \leq 4000$

$3x_2 + 2x_4 + x_5 \leq 6000$

$x_1 + x_2 - 3x_5 \geq 4500$

$x_3 + x_4 - 4x_5 \geq 3000$

$x_1, x_2, x_3, x_4, x_5 \leq 0$

(b) What are the advantages of duality

(c) What is the meaning of shadow prices?

P-1/1