

School of Management and Business Studies  
Department of Management  
B. Com-Semester V  
Odd Semester Examination - December 2025

Roll No...

Subject Name: Business Mathematics-2

Max. Marks: 30

Subject Code: BCH-SE-05

Duration: 1.5 Hour

Section A - Short Answer

(4X3=12)

*Note: Attempt any THREE Questions. All questions carry equal marks.*

Q1. Given

$$A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$$

Find the adjoint of A.

Q2. Distinguish between discrete and continuous probability distributions. Explain with suitable examples.

Q3. Calculate the Present Value of ₹40,000 to be received after 5 years at 7% interest.

Q4. Given the following demand and supply functions for a commodity:

$$Q_d = 90 - 3P$$

$$Q_s = 10 + 2P$$

Determine the equilibrium price and equilibrium quantity.

Q5. A workshop produces bookshelves and cupboards.

- Profit per bookshelf = ₹250
- Profit per cupboard = ₹450

Resource usage:

- A bookshelf requires 4 hours of cutting and 3 hours of polishing.
- A cupboard requires 6 hours of cutting and 5 hours of polishing.

Total available:

- Cutting = 180 hours
- Polishing = 150 hours

Formulate the above into a mathematical optimization problem.

Note: Attempt any **TWO** Questions. *All questions carry equal marks.*

Q1. Solve using matrix inversion:

$$\begin{cases} 3x + y + z = 9 \\ 2x - 3y + 4z = 2 \\ x + 2y - z = 3 \end{cases}$$

Q2. A basket contains 12 apples and 18 oranges. Two fruits are selected at random.

- (a) What is the probability that both fruits selected are apples, if the selection is without replacement?
- (b) What is the probability that both fruits selected are apples, if the selection is with replacement?

Q3. A factory needs to pay ₹80,000 per year for routine machinery servicing over the next 7 years. If the discount rate is 9%, calculate the present value of this expense.

Q4. The inverse demand function of a product is:

$$P = 150 - 0.2Q$$

At the current output level  $Q = 300$  units, the firm wants to measure responsiveness of demand.

- a) Calculate the corresponding price.
- b) Compute the point price elasticity of demand
- c) Interpret the elasticity value.

Q5. Use graphical method to determine the optimal production plan:

Maximize:

$$Z = 100x + 500y$$

Constraints:

$$\begin{aligned} x + 3y &\leq 90 \\ 4x + y &\leq 120 \\ x, y &\geq 0 \end{aligned}$$