

Anekant Education Society's  
**Tuljaram Chaturchand College of Arts, Science & Commerce,**  
**Baramati [Autonomous]**  
**Department of BBA**

**Question Bank :- Business Mathematics [BBA1105]**

**1. Objective Questions.**

**a. Fill in the Blanks**

- i) The Capital is divided into small parts called .....
- ii) The people who purchase shares are called .....
- iii) .....get preference in getting dividend.
- iv) .....were formerly called ordinary shares.
- v) ..... means long term loan taken by the company from public.
- vi) Arranging a number of distinct objects in a line such problem is permutation.
- vii) ..... = total number of permutation of n distinct things, taken r at a time.
- viii) A selection of any r things out of n things is called as a ..... of n things r at a time.
- ix)  $D = \begin{vmatrix} a & b \\ c & d \end{vmatrix}$ , .....
- x) An arrangement of mn numbers in the form of a rectangular block m rows and n columns, calls.....
  
- xi)  $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$  is ..... Matrix.
- xii) Unit matrix indicated by letter .....
- xiii) A square matrix in which all non- diagonal elements are zero is called as ..... Matrix.
- xiv) Elements in which symmetrically situated calls ..... Matrix.
- xv) ..... is the technique of selecting the best possible strategy from a number of alternatives.
- xvi) ..... refers to linear relationship among variables in a model.
- xvii) ..... refers to modeling and solving a problem mathematically.
- xviii) Transportation model is a special class of the .....programming problem.
- xix) VAM stands for .....
- xx) ..... model means the study of optimal transportation and allocation of resources.

## b. True or False

- i) The company is managed by a body of persons known as a body of Directors.
- ii) The total capital of company is divided into a number of small units of equal value called shares.
- iii) Preference Shareholders get last preference in getting dividend.
- iv) Equity Shareholders get dividend at fixed rate.
- v) The price stated on the body of shares or debentures is called its face value.
- vi) Arranging a number of distinct objects in a line calls permutation.
- vii) A matrix, in which all the diagonal elements are equal, is called as scalar matrix.
- viii) Matrix contains only rows.
- ix) A square matrix in which all the elements above the principal diagonal are zero is called an upper triangular matrix.
- x) In addition of matrix no need of same order of two matrix.
- xi)  $|A| = 0$  means inverse does not exist.
- xii) L.P.P. stands for Linear Programming Process.
- xiii) IBFS stands for Initial Basic Feasible Solution.
- xiv)  $A(B+C) = AB+AC$
- xv) VAM is method of finding initial basic feasible solution.

## 2. Write answer in one sentence.

- i) What is the meaning of share?
- ii) What do you mean by stock?
- iii) Explain the term brokerage on one sentence.
- iv) What do you mean by dividend?
- v) Explain the concept market value in one sentence.
- vi) What do you mean by permutation?
- vii) If  ${}^{10}P_r = 5040$ , the find r.
- viii) Explain meaning of null matrix in one sentence.
- ix) What do you mean by minors?
- x) What is matrix method?
- xi) What is meaning of graphical method?
- xii) Which is the first step of formulation L.P.P?
- xiii) What is transportation model?
- xiv) Explain the meaning of North –West corner Method in one sentence.

## 3. Short Notes.

- i) Bonus Shares.
- ii) Preference Shares and Equity Shares.
- iii) Permutation and Combination.
- iv) Optimal solution and Feasible region.
- v) Face Value and Market Value.
- vi) Types of Shares.

#### 4. Short answer questions.

- i) Anil invested Rs. 3, 500 in 7% at Rs. 125. How much dividend will he get?
- ii) By investing Rs. 7, 500 in a Company paying 10% dividend, an income of Rs. 500 is received. What price is paid for each Rs. 100 share?
- iii) Hari and Shyam each invested Rs. 4, 550 in a 5 at 91 and 7 at 130 respectively. Whose investment is more profitable and by how much?
- iv) Which of the following is better investment?  
12% at Rs. 120 or 10% at Rs. 140.
- v) Find n if  ${}^n P_{k-1} = 2 ({}^6 P_{k-2})$ .
- vi) A committee of 5 persons is to be formed out of 4 boys and 4 girls. In how many ways this can be done when:  
a. One girl is included.  
b. Two boys are included.
- vii) A cricket eleven is to be selected from amongst 10 batsmen, 8 bowlers and 2 wicketkeepers so as to include at least 5 batsmen, 4 bowlers and exactly 1 wicketkeeper. In how many ways can be done?
- viii) Find the value of  ${}^{10}C_3 + {}^{10}C_4 + {}^{11}C_5 + {}^{12}C_6$ .
- ix) If  ${}^{48}C_{12} + {}^{48}C_{13} + {}^{49}C_{14} = {}^{50}C_x$  then find x.
- x) If  $A = \begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix}$ , then show that the matrix A satisfies  $A^2 - 4A + I = 0$ .
- xi) Find the value of x if:

$$\begin{pmatrix} 2+x & 3+x & 4+x \\ 1 & 2 & -1 \\ 2 & 1 & 3 \end{pmatrix} = 0$$

- xii) If  $A = \begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$ , then show that  $A (\text{adj } (A)) = A|I$ .

where, I is the identity matrix.

- xiii) If matrix  $A = \begin{pmatrix} 1 & 2 \\ 2 & -1 \end{pmatrix}$   $B = \begin{pmatrix} 1 & 4 \\ -5 & 2 \end{pmatrix}$ , then show that  $(AB)' = B'A'$ .

- xiv) If  $A = \begin{pmatrix} 1 & 2 \\ 8 & 9 \end{pmatrix}$ , then verify that  $A^2 - 3A + I = 0$  or not.

- xv) Obtain an initial basic feasible solution using Matrix Minima method to the following Transportation Problem (T.P.) :

From	To			Supply
	2	7	4	5
3	3	1	8	
1	6	2	22	
5	4	7	10	
Demand	10	20	15	45

- xvi) Solve the following Linear Programming problem by graphical method :  
Maximize  $Z = 15x + 10y$   
Subject to conditions :  $6x + 5y \leq 30$

$$2z + 3y \leq 18$$

$$x, y \geq 0$$

- xvii) Solve the following L.P.P. by graphical method : Minimize  $Z = 4x + 3y$   
Subject to conditions :  $4x + 12y \geq 24$

$$16x + 4y \geq 32$$

$$x, y \geq 0.$$

- xviii) A manufacturing company produces two types of batteries low volt and medium volt. A low volt battery requires 1 hour processing time on machine and 2 hours of labour time. A medium volt battery requires 2 hours of processing time and 1.5 hours of labour time. In a week, processing machine is available for 70 hours and labour time is available for 60 hours. The profit due to each of the low volt battery is Rs. 60 whereas profit due to medium volt battery is Rs. 75. Formulate the above problem as a L.P.P to maximize the total profit.

- xix) Obtain an initial basic feasible solution to the following T.P. by North West Corner Rule (NWCR).

From Warehouses	To				Supply
	S1	S2	S3	S4	
W1	50	150	70	60	50
W2	80	70	90	10	
W3	15	90	80	80	
Demand	20	70	50	10	

- xx) If  $A = \begin{pmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{pmatrix}$ , then find  $|A|$

- xxi) How many different numbers of 3 digits can be formed with the figures 3,5,6,8, repetitions being allowed?

- xxii) Find the determinant of following matrix

$$\begin{pmatrix} 4 & 6 \\ 7 & 3 \end{pmatrix}$$

## 5. Long answer questions.

- i) Obtain an initial basic feasible solution using Vogel's Approximation Method to the following Transportation Problem.

Sources	Destinations				Supply
	D1	D2	D3	D4	
S1	50	150	60	70	50
S2	80	70	10	90	60
S3	15	90	80	80	40
Demand	20	70	10	50	150

- ii) Solve the equations by Matrix inverse method.

$$2x + 3y = 9$$

$$-x + y = 2$$

- iii) A farmer Mr. Piyush is engaged in breeding pigs. The pigs are fed on various products grown on the farm. Because of the need to ensure nutrient constituents, it is necessary to buy additional one or two products, which we shall call A and B. The nutrient constituents (Vitamins and Proteins) in each of the products are given below:

Nutrient Constituents	Nutrient in the products		Minimum requirement of nutrient constituents
	A	B	
X	3	12	036
Y	20	10	100

Product 'A' costs Rs. 20 per unit and product 'B' costs Rs. 40 per unit.

Determine how much of products A and B must be purchased so as to provide the pigs nutrients not less than the minimum required at lowest possible cost.

- iv) Obtain an initial basic feasible solution using Vogel's Approximation Method (VAM) to the following Transportation Problem.

Sources	Destinations				Supply
	D1	D2	D3	D4	
S1	1	2	1	4	30
S2	3	3	2	1	50
S3	4	2	5	9	20
Demand	20	40	30	10	

- v) Solve the following system of linear equations by matrix inverse method:

$$x + y + z = 6$$

$$2x + y + 2z = 10$$

$$3x + 3y + 4z = 21$$

- vi) Write the algorithm to obtain an initial basic feasible solution for the Transportation Problem by North West Corner Rule and Matrix Minima Method.

- vii) Find the adjoint of Matrix A, where:

$$A = \begin{pmatrix} 3 & -4 & 1 \\ -3 & 6 & -1 \\ 4 & -8 & 2 \end{pmatrix}$$

- viii) A firm manufacturing two types of electrical items A and B, can make a profit of Rs. 200 per unit of A and Rs. 300 per unit B. Both A and B make use of two essential components, [5162]-105 6 a motor and a transformer. Each unit of A requires 3 motors and 2 transformers while each unit of B requires 2 motors and 4 transformers. The total supply of components per month is restricted to 240 motors and 280 transformers. Formulate the above problem as L.P.P. to maximise the profit. Obtain the solution by graphical method.

- ix) Obtain initial basic feasible solution using Vogel's Approximation method for following transportation problem :

Market Sources	D1	D2	D3	D4	Supply
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	275	

x) a. If  $A = \begin{pmatrix} 3 & -2 \\ 4 & -2 \end{pmatrix}$  satisfies the matrix equation  $A^2 - kA - 2I = 0$ , find k.

b. Find the adjoint of the matrix D, where  $D = \begin{pmatrix} 2 & 5 \\ 3 & 7 \end{pmatrix}$

and show that  $D(\text{adj } D) = |D|I$ .

xi) Solve the equations using matrix method:

$$2x + y + 2z = 3$$

$$x + y + 2z = 2$$

$$2x + 3y - z = -2$$

xii) Find the inverse of following matrix:

$$\begin{pmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{pmatrix}$$

xiii) Use graphical method to solve the problem:

$$\text{Minimise: } Z = x_1 - 3x_2 + 2x_3$$

Subject to the constraints:

$$3x_1 - x_2 + 3x_3 \leq 7$$

$$-2x_1 + 4x_2 \leq 12$$

$$-4x_1 + 3x_2 + 8x_3 \leq 10$$

$$x_1, x_2, x_3 \geq 0$$