



**PRACTICE SET**  
**End Semester Examination, December, 2025**

**Program: BBA**  
**Semester: III**  
**Subject: Business Mathematics**  
**Subject code: 11.104**

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**Course Objectives:**

- CLO 1: To understand the basics of Matrix and Determinant.  
CLO 2: Describe about various permutation and combinations and explain about Probability.  
CLO 3: To be able to appreciate uses of Mathematical models in real life situations  
CLO 4: To understand commercial arithmetic and calculus and its applications

**Section –A**

**I. Multiple Choice Question**

1. Determinant can be calculated only for:
  - a) Any matrix
  - b) Square matrix
  - c) Row matrix
  - d) Column matrix (CO1) **Remember [LOT]**
2. If two rows of a determinant are interchanged, the value of the determinant:
  - a) Doubles
  - b) Remains the same
  - c) Changes sign
  - d) becomes zero (CO1) **Remember [LOT]**
3. The determinant of an identity matrix is:
  - a) 0
  - b) 1
  - c) -1
  - d) Undefined (CO1) **Remember [LOT]**
4. If ( $|A| = 0$ ), then A is called:
  - a) Non-singular matrix
  - b) Singular matrix
  - c) Identity matrix
  - d) Diagonal matrix (CO1) **Remember [LOT]**
5. The order of the product of matrices A ( $2 \times 3$ ) and B ( $3 \times 4$ ) is:
  - a)  $3 \times 3$
  - b)  $2 \times 4$







(C) 10%

(D) 9.75% (CO3) **Remember [LOT]**

31. The value of an asset after depreciation follows which formula?

(A)  $C(1 + r)^n$

(B)  $C(1 - r)^n$

(C)  $C(1 + r/n)^n$

(D) None (CO4) **Understand [LOT]**

32. Payments at the beginning of each period represent:

(A) Ordinary annuity

(B) Annuity due

(C) Deferred annuity

(D) Perpetuity (CO4) **Understand [LOT]**

33. Present value of a perpetuity paying ₹500 annually at 10% interest is:

(A) ₹5000

(B) ₹4500

(C) ₹5500

(D) ₹4000 (CO4) **Understand [LOT]**

34. If ₹10,000 is invested at 12% p.a. compounded monthly, effective rate = ?

(A) 12%

(B) 12.68%

(C) 13%

(D) 11.8% (CO4) **Remember [LOT]**

35. Average due date is used to determine:

(A) Discounted cash flow

(B) Equivalent single payment date

(C) Depreciation value

(D) Future value of annuity (CO4) **Understand [LOT]**

36.. In an ordinary annuity payments are made:

(A) At the beginning of each period

(B) At the end of each period

(C) Continuously

(D) Randomly (CO4) **Remember [LOT]**

37. An annuity due is one in which payments are made:

(A) At the end of each period

(B) At the beginning of each period

(C) After a deferred period

(D) None of these (CO4) **Understand [LOT]**

38. If an annuity continues forever, it is called:

(CO4) **Understand [LOT]**

(A) Deferred annuity

(B) Perpetuity

(C) Continuous annuity

(D) Ordinary annuity

39. The present value of a perpetuity paying ₹1,000 per year at 5% is:

(A) ₹20,000

(B) ₹10,000

(C) ₹15,000

(D) ₹25,000 (CO4) **Remember [LOT]**

40. The effective rate of interest is always:

(A) Equal to nominal rate (B) Greater than nominal rate (for more frequent compounding)

(C) Less than nominal rate (D) Independent of compounding (CO4) Understand [LOT]

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### UNIT - 1 (Section –B)

**Marks: 10**

1. If  $A = \begin{bmatrix} 5 & -2 & 2 & 2 & 3 \\ -2 & 5 & 2 & 6 \end{bmatrix}$  and  $B = \begin{bmatrix} 4 & 6 & -6 & 2 & 2 & 3 \\ -6 & -4 & 3 \end{bmatrix}$  Find  $4A - 3B$   
(CO1) Understand **[LOT]**

2. Find the co-factor of the elements and find the value of determinate (CO1) **Remember [LOT]**  
Where  $A = \begin{bmatrix} 3 & 5 & 4 & 1 & 2 \\ -2 & 5 & 3 & 1 \end{bmatrix}$

3. If  $A = \begin{bmatrix} 3 & 5 & 6 & 1 & 5 & 3 & 5 & 9 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 2 & 3 & 2 & 1 & 1 & 1 & 2 & 1 \end{bmatrix}$  find  $A \times B$   
(CO1) Understand **[LOT]**

4. Solve the following system of equation using by Cramer's Rule

$$5x - 7y + z = 11, 6x - 8y - z = 15, 3x + 2y - 6z = 7 \quad (\text{CO 1}) \text{ Apply [LOT]}$$

5. Solve the rank of the matrix  $A = \begin{bmatrix} 1 & 2 & 3 & 2 & 3 & 4 & 3 & 4 & 5 \end{bmatrix}$  (CO1) Apply **[LOT]**

6. If  $A = \begin{bmatrix} 1 & 2 & 2 & 2 & 1 & 2 & 5 & 2 & 1 \end{bmatrix}$  Find  $A^2 - 4A - 5I$  (CO1) Apply **[LOT]**

### 20 Marks Questions

7. Solve the the following system of linear equation by Using matrix Method

$$3x + 2y - 2z = 3, x + 2y + 3z = 6, 2x - y + z = 2 \quad (\text{CO 1}) \text{ Evaluate [HOT]}$$

8. Evaluate (i) If  $A = \begin{bmatrix} 1 & 2 & 2 & 2 & 1 & 2 & 5 & 2 & 1 \end{bmatrix}$   $A^{-1}$  and hence prove that  $A^2 - 4A - 5I = 0$

(CO1) Evaluate **[HOT]**

(ii) Let  $A = \begin{bmatrix} 1 & -2 & 5 & 3 & 4 & 0 \end{bmatrix}$ ,  $B = \begin{bmatrix} 3 & 1 & 0 & -3 & 2 & 5 \end{bmatrix}$  and  $C = \begin{bmatrix} 4 & 3 & -2 & 1 & 2 & 6 \end{bmatrix}$   
(CO1) Evaluate **[HOT]**

$$\text{Verify that } (A + B) + C = A + (B + C)$$

## UNIT - 2 (Section –B)

### Marks questions (10)

9. Find the value of  ${}^6P_4$  and  ${}^{10}P_5$  (Co2) Understand [LOT]
10. Find the number of permutations of the word “MATHEMATICS”. (Co2) Understand [LOT]
11. List all Permutation of the letter “ABCD” (Co2) Understand [LOT]
12. From 7 boys and 5 girls, 6 are to be selected to admission for a particular house. In how many ways can be done if there must be exactly 2 girls. (Co2) Remember [LOT]  
(Co2) Analyze [HOT]
13. Prove that  ${}^nP_r = {}^{n-1}P_r + r \cdot {}^{n-1}P_{r-1}$

### 20 Marks Questions

14. (i) Prove that  ${}^nC_r + {}^nC_{r-1} = {}^{n+1}C_r$  (Co2) Analyze [HOT]  
(ii) If  ${}^nP_r = 720$  and  ${}^nC_r = 120$ , find r. (Co2) Remember [HOT]
15. (i) Find the how many ways can a committee of 5 members be selected from 6 men and 5 ladies, Consisting of 3 men and 2 ladies? (Co2) Create [HOT]  
(ii) Find the how many 4 – letters words with or without meaning, can be formed out of the letters of the word ‘LOGARITHMS’ if repetition of letters is not allowed? (Co2) Create [HOT]

## UNIT III

### (Differentiation) (Section –B)

#### 10 Marks Questions: -

16. If  $xy = x^3 + y^3$  find  $\frac{dy}{dx}$ . (Co3) Understand [LOT]
17. If  $x^3 + y^3 = \sin(x + y)$ , find  $\frac{dy}{dx}$  (Co3) Remember [LOT]
18. If  $y = x \log x - x$  then find  $\frac{dy}{dx}$ . (Co3) Remember [LOT]
19. If  $x \cos y = \sin(x + y)$ , find  $\frac{dy}{dx}$  (Co3) Apply [LOT]
20. If  $x^3 + y^3 = 3axy$ , find  $\frac{dy}{dx}$  (Co3) Apply [LOT]
21. Solve the,  $\frac{dy}{dx}$ , when  $x = a(t + \sin t)$  and  $y = a(1 - \cos t)$  (Co3) Apply [LOT]

22. If  $y = \sqrt{\sin x + \sqrt{\sin \sin x + \sqrt{\sin \sin x + \sqrt{\sin \sin x + \dots \dots \dots \infty}}}}}$  find  $\frac{dy}{dx}$ .

## 20 Marks Questions

23 (i) *Find the Maximum and minimum value*

$$y = x^3 + 6x^2 - 15x + 5$$

(Co3) Evaluate [HOT]

(ii) **If  $y = \tan(x + y)$ . Find  $dy/dx$**

(Co3) Evaluate [HOT]

24. An orange grower finds that an orange tree produces on average, 400 oranges per year. If more than 16 trees are planted in a unit area. For each additional tree planted per unit area the grower finds that the yield decreases by 20 oranges per tree. How many trees should the grower plant per unit area so as to get the maximum yield?

(CO3) Evaluate [HOT]

### UNIT – 4 (Section –B)

#### 10 Marks question:

25. Calculate rate of interest p.a. does a person get who is paid at the rate of 5% C.I. payable half yearly.
- (CO4) [LOT] Understand
26. Explain basic factors affecting the amount of depreciation.
- (CO4) [LOT] Understand
27. Define annuity and what are the different types of annuities?
- (CO4) [LOT] Remember
28. Calculate the how many years will the population of a village change from 2500 to 2601, if the rate of increase is 2% p.a.
- (CO4) [LOT] Apply

## 20 Marks Questions

29. On July 01, 2010, Ashok Ltd. Purchased a Machine for ₹ 1, 08,000/- and spent ₹ 12,000/- on its installation. At the time of purchase it was estimated that the effective commercial life of the machine will be 12 years and after 12 years its salvage value will be ₹ 12,000. Prepare machine account and depreciation Account in the books of Ashok Ltd. For first three years, if depreciation is written off according to straight line method. The accounts are closed on December 31st, every year.
- (CO4) [LOT] Apply
30. Belia Ltd. Purchased a second-hand machine for Rs. 56,000/- on July 01, 2015 and spent Rs. 24,000/- on its repair and installation and Rs 5,000/- for its carriage. On September 01, 2016, it purchased another machine for Rs. 2,50,000/- and spent Rs 10,000/- on installation.
- (i) Depreciation is provided on machinery @ 10% p.a. on original cost method annually on December 31. Prepare machinery account from the year 2015 to 2018.
- (ii) Prepare machinery account and depreciation account from the year 2015 to 2018, if depreciation is provided on machinery @ 10% p.a. on written down value method annually on December 31.

(CO4) Analyze [HOT]

## Summary Sheet

### CO Wise

CO	Q. No.	Marks
CO1	Section –A 1,2,3,4,5, 6,7,8,9,10,	10
	Section- B 1,2,3,4,5,6,7,8	100
CO2	Section- A 11,12,13,14,15,16,17,18,19,20	10
	Section- B 9,10,11,12,13,14,15	90
CO3	Section -A- 2 1,22,23,24,25,26,27,28,29,30	10
	Section- B 16,17,18,19,20,21,22,23,24	110
CO4	Section- A 31,32,33,34,35,36,37,38,39,40,	10
	Section- B 25,26,27,28,29,30	80
<b>Total =</b>		<b>420</b>

### Unit Wise

Unit	Q. No.	Marks
<b>Unit 1</b>	Section –A 1,2,3,4,5, 6,7,8,9,10,	<b>110</b>
	Section- B 1,2,3,4,5,6,7,8	
<b>Unit 2</b>	Section- A 11,12,13,14,15,16,17,18,19,20	<b>100</b>
	Section- B 9,10,11,12,13,14,15	
<b>Unit 3</b>	Section -A- 21,22,23,24,25,26,27,28,29,30	<b>120</b>
	Section- B 16,17,18,19,20,21,22,23,24	
<b>Unit 4</b>	Section- A 31,32,33,34,35,36,37,38,39,40,	<b>90</b>
	Section- B 25,26,27,28,29,30	
<b>Total =</b>		<b>420</b>

### Blooms Taxonomy Level (BTL) Wise

BTL	Q. No.	Marks
<b>LOT</b>	Section-A 1,2,3,4,5,6,7,8,9,11,12,13,14,15,16,17,20,22,23,24,25,26,27,28,29,30,33,34,35,36,37, 38,39,40	220
	Section-B 1,2,3,4,5,6,9,10,11,12,16,17,18,19,20,21,22,25,26,27,28	
<b>HOT</b>	Section –B 7,8,10,13,14,15,23,24,29,30	200
<b>Total =</b>		<b>420</b>

### Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Understand the concepts of Matrices and Schedules with reference to business process.

CO 2: Simplify the probability of events, their Permutations and Combination.

CO 3: Apply differential calculus to solve simple business problems

CO 4: Explain mathematical formulation and solution of problems related to finance including different methods of interest calculation, future and present value of money.

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**Disclaimer:** - This is a Practice Set. The Question in End term examination will differ from the Practice set. This Practice set is meant for practice only.