

**2025/FYUG/ODD/SEM/
MTMIDC-101T/066**

FYUG Odd Semester Exam., 2025

MATHEMATICS

(1st Semester)

Course No. : MTMIDC-101T

(Foundation Course in Mathematics)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

UNIT—1

1. Answer any *four* of the following : $1 \times 4 = 4$

(a) Write the place value of 7 in 3725.

(b) State whether 51 is divisible by 3.

(c) Find the GCD of 12 and 18.

(d) Express 0.75 as a fraction in lowest form.

(e) What is 10% of 250?

2. Answer any one of the following :

- (a) Find the LCM and GCD of 24 and 36.
 (b) A sum of ₹ 500 earns simple interest of ₹ 50 in 2 years. Find the rate of interest.

3. Answer any one of the following :

- (a) A shopkeeper buys an article at ₹ 1,200 and sells it at ₹ 1,440 after allowing 10% discount. Find his profit percentage.
 (b) A man borrows ₹ 5,000 at 12% compound interest. Find the amount due after 3 years.

UNIT—2

4. Answer any four of the following as directed :

- (a) If 5 workers complete a task in 10 days, how many days will 1 worker take?
 (b) Distance travelled in 3 hours at 40 km/hour is ____.

(Fill in the blank)

- (c) Express 81 as a power of 3.
 (d) How many subsets does a set with 2 elements have?
 (e) Write $A \times B$, where $A = \{1, 2\}$ and $B = \{a\}$.

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5. Answer any one of the following :

- (a) A man covers 120 km in 3 hours. Find his speed.
 (b) Let $A = \{1, 2, 3\}$ and $B = \{2, 3, 4\}$. Find $A \cup B$ and $A \cap B$.

6. Answer any one of the following :

- (a) A train travels 120 km at 40 km/h and returns at 60 km/h. Find the average speed.
 (b) Let $A = \{1, 2, 3\}$ and $B = \{a, b\}$. Find $A \times B$ and verify that

$$n(A \times B) = n(A) \cdot n(B)$$

where $n(S)$ denotes the number of elements in a set S .

UNIT—3

7. Answer any four of the following :

- (a) Write the general form of a linear equation in two variables.
 (b) If $x + y = 5$ and $x = 2$, then find y .
 (c) Write the 5th term of the AP 2, 5, 8, 11, ...

- (d) What is the common ratio of the GP 2, 6, 18, 54, ...?

- (e) Write the standard form of a quadratic equation.

8. Answer any one of the following :

(a) Find the 10th term of the AP
5, 8, 11, ...

(b) Find the 10th term of the GP
2, 6, 8, 54, ...

9. Answer any one of the following :

(a) Solve $3x - 2y = 5$ and $2x + 3y = -1$.

(b) Find the sum of the first 15 terms of the AP
7, 10, 13, 16, ...

UNT—4

10. Answer any four of the following :

(a) How many ways can 3 objects be arranged?

(b) Write the binomial expansion of $(1 + x)^2$.

(c) What is the probability of getting head on tossing a coin?

(d) Find the value of 4C_2 .

(e) State binomial theorem for positive integer n .

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(5)

1. Answer any one of the following : 2

(a) In how many ways can the letters of the word 'MATHEMATICS' be arranged?

(b) Find the probability of getting an even number on rolling a die.

2. Answer any one of the following : 8

(a) Expand $(x + 2)^7$ using binomial theorem. Hence write the coefficients of x^5 and x^3 .

(b) A bag contains 3 red and 2 black balls. Two balls are drawn at random. Find the probability that both are red.

UNT—5

13. Answer any four of the following : $1 \times 4 = 4$

(a) What is meant by order of a matrix?

(b) Write the transpose of the matrix

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

(c) Find the determinant of the matrix

$$\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$$

(d) Give an example of a symmetric matrix.

(e) Write the identity matrix of order 2.

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(Turn Over)

14. Answer any *one* of the following :

(a) Evaluate $|A|$, where

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

(b) Solve the following by determinants :

$$x + y = 3 \text{ and } 2x - y = 4$$

15. Answer any *one* of the following :

(a) Show that any square matrix can be uniquely expressed as a sum of a symmetric and a skew-symmetric matrix.

(b) Using elementary operations on matrices, solve the following system of linear equations :

$$x + y + z = 6$$

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

$$3x + 2y - z = 4$$

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