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 : 1×4=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?

Scanned with OKEN Scanner

2. Answer any *one* of the following : 2

(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 : 8

(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 : 1×4=4

(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 $B = \{a\}$.

5. Answer any *one* of the following : 2

(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 : 8

(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 : 1×4=4

(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.

Scanned with OKEN Scanner

8. Answer any *one* of the following : 2

(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 : 8

(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, ...

UNIT—4

10. Answer any *four* of the following : 1×4=4

(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.

11. 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.

12. 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.

UNIT—5

13. Answer any *four* of the following : 1×4=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.

Scanned with OKEN Scanner

14. Answer any *one* of the following : 2

(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 : 8

(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 :

$$x + y + z = 6$$
$$2x - y + z = 3$$
$$3x + 2y - z = 4$$

★★★

Scanned with OKEN Scanner