

This Question Paper contains 4 Printed Pages.

**New Syllabus**

**15E(A)**

**MATHEMATICS, Paper - I**

(English version)

(Parts A and B)

**Time : 2 hrs. 45 min.]**

**[Maximum Marks : 40**

**Instructions :**

1. In the time duration of 2 hours 45 minutes, 15 minutes of time is allotted to read and understand the Question paper.
2. Answer the Questions under **Part - A** on a separate answer book.
3. Write the answers to the questions under **Part-B** on the question paper itself and attach it to the answer book of **Part-A**.

**Part - A**

**Time : 2.15 Hours**

**Marks : 35**

**Note :**

1. Answer **all** the questions from the given **three** sections I, II and III of **Part-A**.
2. In section - III, every question has internal choice. Answer **any one** alternative.

**SECTION - I**

(Marks : 7×1=7)

**NOTE :** (i) Answer **all** the following questions.

(ii) Each question carries 1 mark.

1. Find the value of  $\log_5 125$ .

2. If  $A = \left\{ 1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25} \right\}$ , then write A in Set-builder form.

3. Write an example for a quadratic polynomial that has no zeroes.
4. If  $b^2 - 4ac > 0$  in  $ax^2 + bx + c = 0$ ; then what can you say about roots of the equation? ( $a \neq 0$ )
5. Find the sum of first 200 natural numbers.
6. For what values of  $m$ , the pair of equations  $3x + my = 10$  and  $9x + 12y = 30$  have a unique solution.
7. Find the mid point of the line segment joining the points  $(-5, 5)$  and  $(5, -5)$

**SECTION - II**(Marks :  $6 \times 2 = 12$ )

- NOTE :** (i) Answer **all** the following questions.  
 (ii) Each question carries 2 marks.

8. If  $x^2 + y^2 = 7xy$  ;  
 then show that  $2 \log(x + y) = \log x + \log y + 2 \log 3$ .
9. Length of a rectangle is 5 units more than its breadth. Express its perimeter in polynomial form.
10. Measures of sides of a triangle are in Arithmetic Progression. Its perimeter is 30 cm, and the difference between the longest and shortest side is 4 cm; then find the measures of the sides.
11. Show that the points  $A(-3, 3)$ ,  $B(0, 0)$ ,  $C(3, -3)$  are collinear.

12. Solve the following pair of linear equations by Substitution method.

$$2x - 3y = 19 \text{ and } 3x - 2y = 21.$$

13. If  $9x^2 + kx + 1 = 0$  has equal roots, find the value of  $k$ .

### SECTION - III

(Marks :  $4 \times 4 = 16$ )

#### NOTE :

1. Answer **all** the following questions.
2. In this section, every question has internal choice.
3. Answer **any one** alternative.
4. Each question carries 4 marks.

14. Use Euclid's division lemma to show that the cube of any positive integer is of the form  $7m$  or  $7m+1$  or  $7m+6$ .

**OR**

Prove that  $\sqrt{2} - 3\sqrt{5}$  is an irrational number.

15. Draw the graph for the polynomial  $p(x) = x^2 - 3x + 2$  and find the zeroes from the graph.

**OR**

Draw the graph for the following pair of linear equations in two variables and find their solution from the graph.

$$3x - 2y = 2 \text{ and } 2x + y = 6.$$

16. Sum of the squares of two consecutive positive even integers is 100; find those numbers by using quadratic equations.

**OR**

- 16) X is a set of factors of 24 and Y is a set of factors of 36, then find sets  $X \cup Y$  and  $X \cap Y$  by using Venn diagram and comment on the answer.
17. Find the sum of all the three digit numbers, which are divisible by 4.

**OR**

- 18) Find the co-ordinates of the points of trisection of the line segment joining the points  $(-3, 3)$  and  $(3, -3)$ .
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