

**MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE**  
**SEMESTER END THEORY EXAMINATION**

**B.Sc.(Hons.) Horticulture**

Semester	: I (New)	Term	: First	Academic Year	: 2023-24
Course No.	: MATH 111	Title	: Mathematics		
Credits	: 2 (1+1)				
Day & Date	: Thursday, 11.01.2024	Time	: 15:00 to 17:00 hrs.	Total Marks	: 40

- Note :**
1. Solve ANY EIGHT questions from SECTION 'A'.
  2. All questions from SECTION 'B' are compulsory.
  3. All questions carry equal marks.
  4. Draw neat diagram wherever necessary.

**SECTION 'A'**

- Q.1 Write the equation by which the roots of quadratic equation are given. Enlist the conditions that define the nature of roots.
- Q.2 Find the roots of the given quadratic equations:  
i)  $x^2 - x - 6 = 0$       ii)  $2x^2 + 7x + 6 = 0$
- Q.3 Apply Simpson's rule to find the area of a plot having the following dimensions:  
Ordinates: 2, 7, 9, 8, 8, 8, 6, 4 and 1 m and common distance is 6 m.
- Q.4 If  $\begin{vmatrix} x & 3 & 3 \\ 3 & 3 & x \\ 2 & 3 & 3 \end{vmatrix} = 0$ , find the value of  $x$ .
- Q.5 Find the equation of a circle whose radius is 5 and centre (-2, 2).
- Q.6 State any four theorems of limits.
- Q.7 What is Function? Enlist any three types of functions along with example.
- Q.8 Find the derivatives of the following:  
i)  $5x^5 + 55x^4 - 5x^2 - 50$       ii)  $(1-x)/x$       iii)  $x \sin x$       iv)  $\log \sqrt{x^2 + 1}$
- Q.9 Find the co-ordinates of centre and radius of a circle whose equation is:  
 $x^2 + y^2 - 3x - 3y + 3 = 0$ .
- Q.10 Write the theorems (or rules) of differentiation.

**SECTION 'B'**

- Q.11 Fill in the blanks:
- 1) If any two rows or two columns of the determinant are identical, then the value of the determinant is \_\_\_\_\_.
  - 2) If  $ax^2 + bx + c = 0$  is a quadratic equation, then its roots are given by \_\_\_\_\_.
  - 3) The general form of equation of circle is \_\_\_\_\_.
  - 4)  $e^x$  is a/an \_\_\_\_\_ function.

(P.T.O.)

Q.12 State True or False:

- 1)  $\frac{d}{dx} \log x = x^{-1}$ .
- 2) The limit of product of two functions is equal to the product of their limits.
- 3)  $\log(x^2)$  is a polynomial function.
- 4) Simpson's rule is applicable to find the area of an irregular field with even number of ordinates.

