

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE  
SEMESTER END EXAMINATION

B.Sc. (Agri.) / B.Sc. (Hort.) / B.Sc. (Forestry) / B.B.A. (Agri.) / B.Sc. (Agri. Bio -Tech.)

Semester	: I (New)	Term	: I	Academic Year	: 2016-17
Course No.	: MATH 111	Title	: Mathematics ( Deficiency Course )		
Credits	: 2(1+1)	Time	: 10.00 to 13.00	Total Marks	: 80
Day & Date	: Monday, 05.12.2016				

- 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 diagrams wherever necessary.

SECTION "A"

- Q.1 a) State Simpson's rule to find the area of a curvilinear figure with labeled diagram.  
b) Find the area of a curvilinear figure whose ordinates are 2, 7, 9, 15, 21, 30, 12 mtr and common distance is 33 mtrs.
- Q.2 a) Prove that  $\log\left(\frac{M}{N}\right) = \log M - \log N$ .  
b) Find the logarithm of 125 to the base  $5\sqrt{5}$ .
- Q.3 a) Prove that the product of two roots of quadratic equation  $ax^2 + bx + c = 0$  is  $c/a$ .  
b) Solve the quadratic equation  $x^2 - 4x + 3 = 0$
- Q.4 a) State any four theorems on limit of a function.  
b) Evaluate  $\lim_{x \rightarrow 2} \frac{x^7 - 128}{x^5 - 32}$
- Q.5 a) Find the derivative of a functions 1)  $2x^3 - 3x^2$                       2)  $x^2 \cdot \sin x$   
b) If  $y = f(u)$  and  $u = g(x)$  are differentiable functions of  $u$  and  $x$  respectively,  
then prove that  $\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$
- Q.6 a) State any four properties of determinant with example.  
b) Evaluate  $\begin{vmatrix} 2 & 3 & 1 \\ 0 & 1 & 2 \\ 5 & -3 & 4 \end{vmatrix}$
- Q.7 a) Find the equation of a circle having its centre at the point (3, 0) and radius 7 units.  
b) Find the co-ordinates of the centre and radius of the circle  $x^2 - y^2 + 4x - 6y = 0$
- Q.8 a) Find the equation of a straight line passing through the two points (1, 2) and (4, 3)  
b) A vertical flagstaff stands on horizontal plane, from a point of distance 75 meters from its foot the angle of elevation of its top found to be  $30^\circ$ . Find the height of the flagstaff.
- Q.9 a) Prove that  $\int \frac{f'(x)}{f(x)} dx = \log [f(x)] + c$   
b) Evaluate the integral: 1.  $\int \sin(2x + 7) dx$       2.  $\int (4x^3 + 3x^2 + 2x + 1) dx$

(P.T.O)

Q.10 a) Prove that  $\int_a^b f(x)dx = -\int_b^a f(x)dx$

b) Evaluate the definite integral: 1.  $\int_1^2 \left(\frac{1}{x}\right) dx$

2.  $\int_0^1 \sin x dx$

**SECTION "B"**

Q.11 Correct the following sentences if necessary and rewrite it.

- 1) The radius of the circle  $x^2 + y^2 = 25$  is 25.
- 2) The derivative of a constant is 1.
- 3) The quadratic equation has more than two roots.
- 4) Integration and derivative are similar processes.
- 5)  $\tan 45^\circ = 1$
- 6)  $e^x$  is a logarithmic function.
- 7) The limit of a function is unique.
- 8) Simpson's rule can be applied only when even ordinates are given.

Q.12 Fill in the blanks.

- 1)  $5x^2 - 1 = 0$  is \_\_\_\_\_ equation.
- 2) The point (0, -4) lies in \_\_\_\_\_ quadrant.
- 3) The derivative of  $\log x$  is \_\_\_\_\_.
- 4) The logarithm of base itself is \_\_\_\_\_.
- 5) The equation of y axis is \_\_\_\_\_.
- 6)  $d/dx (\cos x) =$  \_\_\_\_\_.
- 7) The condition of two lines to be parallel is \_\_\_\_\_.
- 8) If the height and distance is equal then the angle of elevation is \_\_\_\_\_.

