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**	: **2015-16**
Course No.	: MATH 111	**Title**	: **Mathematics (Deficiency Course)**		
Credits	: 2(1+1)				
Day & Date	: Friday, 04.12.2015	**Time**	: 10.00 to 13.00	**Total Marks**	: **80**

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) Prove that the sum of roots of quadratic equation $ax^2 + bx + c = 0$ is $-b/a$ where $a \neq 0$.

b) Form the quadratic equation whose roots are 8 and -7. Also find the roots of the quadratic equation $x^2 - 4x - 2 = 0$.

Q.2 a) Write any four properties of logarithm with proper syntax.

b) Express the log of $\frac{\sqrt[3]{a^5}}{\sqrt{c^5 b^3}}$ in terms of log a, log b, and log c.

Q.3 a) Explain any four properties of determinant with suitable example.

b) Evaluate 1. $\begin{vmatrix} 3 & 0 & 2 \\ 4 & 2 & 0 \\ 3 & 1 & 7 \end{vmatrix}$ 2. $\begin{vmatrix} 4 & 2 & 5 \\ 1 & 6 & 7 \\ 3 & 8 & 9 \end{vmatrix}$

Q.4 a) Find the distance between two points whose co-ordinates are (3,4) and $(-5, -6)$.

b) Find the co-ordinates of the points which internally divide the line joining the points (6,7) and (8,9) in the ratio 3:7.

Q.5 a) Define locus. Write 1. Equation of straight line parallel to axes, 2. Equation of straight line : Slope – intercept form, 3. Equation of straight line: two points form.

b) Show that the point P (5,4) is equidistant from the points Q (9,8) and Q (1,0).

Q.6 a) Find the equation of circle whose center is $(-3, 4)$ and radius is 7 unit.

b) Find the centre and radius of a circle $x^2 + y^2 - x - y - 6 = 0$.

Q.7 a) A vertical flagstaff stands on a horizontal place. The angle of elevation of its top was found to be 30^0 from a point at a distance of 52.5 m from its foot. Find the height of the flagstaff.

b) Write any four functions and state the example of each type.

Q.8 a) State any four theorems of limit.

b) Evaluate

1) $\lim_{x \to 0} \frac{\sin 3x}{\sin 7x}$ 2) $\lim_{x \to 0} \frac{x^2 - 121}{x - 11}$

(P.T.O.)

Q.9 a) Differentiate the following

1) $3x^5 + 3x^4 + 1$ 2) $\frac{x^2+1}{x}$

b) Find the area of the curvilinear figure by Simpson's rule. The ordinates are 9, 13, 17, 20, 22, 14, 8 m and the common distance is 3 m.

Q.10 a) Evaluate (Any two).

1) $\int \frac{(x+3)(x-5)}{x} dx$

2) $\int_0^1 \sqrt{x dx}$

3) $\int_0^1 2^x \, dx$

b) Write the chain rule for differentiation of composite function.
Differentiate $\log \sqrt{1+x^2}$.

SECTION "B"

Q.11 Fill in the blanks.

1) The roots of a quadratic equation real and equal if $b^2 - 4ac =$ _____.
2) $\log_7 343 =$ _____.
3) If all the elements of row or column of a determinant is zero, then the value of the determinant is _____.
4) The co-ordinates of the mid point joining the points (2, 4) and (6, 8) is _____.
5) The slope of a straight line whose equation is $3y = 17x - 17$ is _____.
6) If an equation of circle is $x^2 + y^2 = 12$, then its radius is _____.
7) $y = \log x + 10$ is _____ type of function.
8) $\lim_{x \to a} \cos x =$ _____.

Q.12 State True or False.

1) $\frac{d}{dx}(u \times v) = v\frac{du}{dx} + u\frac{dv}{dx}$

2) The Simpson's rule can be applied only if the number of ordinate is even.
3) If any two rows / columns of determinant are identical, its value is equal to zero
4) $2x^2 + 1 = 0$ is quadratic equation.
5) Point $(1, -1)$ lies in first quadrant.
6) The equation of Y-axis is $x=0$.
7) The limit of a function is unique.
8) Integration of a constant function is zero.

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