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)				
Day & Date	: Monday, 05.12.2016	**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) 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 $\left(\frac{M}{N}\right)$ = LogM − 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 $lim_{x \to 2} \frac{x^7 - 128}{x^5 - 32}$

Q.5 a) Find the derivative of a functions 1) $2x^3 - 3x^2$ 2) $x^2 . \sin x$
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 30^0. Find the height of the flagstaff.

Q.9 a) Prove that : $\int \frac{f'(x)}{f(x)} dx = \text{Log}[f(x)] + c$
b) Evaluate the integral: 1. $\int Sin(2x + 7)dx$ 2. $\int (4x^3 + 3x^2 + 2x + 1)dx$

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

b) Evaluate the definite integral: 1. $\int_1^2 (\frac{1}{x})\ dx$ 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 $45^0 = 1$
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_____.

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