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End Semester Examination, December 2024

B.Sc.(Hons.) Agriculture – Ist Semester

Elementary Mathematics (ASAG111)

Time: 2.5 hrs.

Max Marks: **50**

Note: **All Questions are compulsory. Marks are indicated against each question.**

PART-A

Q.1 **Attempt any Five Questions.**

- (a) Define null matrix or 2^{nd} order. [CO-1] [L-1] **2**
- (b) $A = \begin{pmatrix} 2 & 0 \\ 3 & 1 \end{pmatrix}$, find $\det A$. [CO-1] [L-1] **2**
- (c) Define lower triangular matrix. [CO-1] [L-1] **2**
- (d) Prove $1 + \cot^2 x = \operatorname{cosec}^2 x$ [CO-2] [L-5] **2**
- (e) Plot graph of $y = 2$. [CO-3] [L-3] **2**
- (f) What is the value of $\sin(-30)$ [CO-2] [L-1] **2**
- (g) Find $\frac{d}{dx} x^3$ [CO-1] [L-1] **2**

2x5

PART-B

Q.2 Find the adjoint of matrix $A = \begin{bmatrix} 3 & -4 \\ 4 & 0 \end{bmatrix}$ [CO-1] [L-1] **10**

OR

If $A = \begin{bmatrix} 3 & 4 \\ 8 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 10 \\ -2 & -5 \end{bmatrix}$, find $A \wedge B$. [CO-1] [L-1] **10**

Q.3 Use Cramer's rule to solve the following systems of equations: $x - y = 4$, $x + y = 2$ [CO-1] [L-3] **10**

OR

Find the area of a triangle whose vertices are (1,1), (0,2) and (1,2) [CO-2] [L-1] **10**

Q.4 If $\cot x = \frac{-5}{12}$, x lies in second quadrant, determine the value of $\operatorname{cosec} x$. [CO-2] [L-5] **10**

OR

Show that $\sin 3x = 3 \sin x - 4 \sin^3 x$ [CO-4] [L-2] **10**

Q.5 Find the derivative of the function $f(x) = x^2 + 5x - 6$ at $x = 0$, Also find the value of $f'(0) + 3f'(-1)$. [CO-3] [L-1] **10**

OR

Find the derivative of the function $f(x) = 2e^{-x} + 2\cos x - 54$ at $x = 0$,

[CO- 3] [L-1] **10**