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B.Sc. (Ag.) (Hons.) End Semester

Examination, 2020

Semester-I

Paper - XI

(Elementry Mathematics/Basic

Agriculture-II)

Time : Three Hours] [Maximum Marks : 50

Note : The question paper is divided into **three** Sections A, B and C. Answer the questions of each section as per instructions.

Section - A

Note : This section contains only **one** question, having **ten** (10) parts. Each part carries **1** mark. Answer the questions in very short.

P.T.O.

(2)

1. (a) Out of the following ✓

(i) $x = 3$ (ii) $y = 3$ and (iii) $y = 3x + 5$

which one is equation of line parallel to x-axis.

(b) Find the angle between the lines

$y = x + 2$ and $y = -x - 2$.

(c) Show that the area of the triangle with vertices

$(0, 0)$, $(1, 0)$ and $(0, 1)$ is $1/2$ units.

(d) The centre of the circle

$$x^2 + y^2 - 2x - 4y + 1 = 0$$

is the point $(1, 2)$. Find its radius.

(e) Write down the condition under which the line $y = mx + c$ touches the circle

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(3)

$$x^2 + y^2 = a^2.$$

(f) The equation of normal at the point

$(a \cos \theta, a \sin \theta)$ of the circle is $y = x \tan$

θ . Prove it.

(g) Define the continuity of a function at a point.

(h) Write down the formulae for derivatives of the product and quotient of two functions.

(i) In the formula

$$\int f(x) dx = g(x) + C.$$

What are the values of C.

(j) Write down two differences in between matrices and determinants.

(4)

Section - B

Note : Attempt all the **five** questions of this section. Each question has an internal option. Give answers in about 200 words. Each question carries 5 marks.

2. Find the equation of straight line orthogonal to $y-x=8$ which passes through the point of intersection of $x+2y+3=0$ and $3x+4y+7=0$.

OR

Find the equation of straight line parallel to $x/a + y/b = 1$ and passing through (a, b) .

3. Find the equation of circle having centre at $(2, -1)$ and passing through $(3, 6)$.

OR

Prove that equation of the circle having $(1, 2)$ and $(3, 4)$ as extremities of one of its diameter is $x^2 + y^2 - 4x - 6y + 11 = 0$

(5)

4. Test the function :

$$f(x) = \begin{cases} 4x + 3 & x \neq 4 \\ 3x + 7 & x = 4 \end{cases}$$

for continuity at $x = 4$

OR

Find the differential coefficient of e^x from first principle.5. Given $I = \int e^x \sin x \, dx$

Prove that $I = \frac{1}{2}(\sin x - \cos x) e^x$

OR

Evaluate $\int_0^{\pi/4} \tan^3 x \sec^2 x \, dx$

6. For the matrices

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 0 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 0 & 3 \\ 4 & 1 & 0 \end{bmatrix}$$

find the product AB . Can we form the product BA .

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P.T.O.

(6)

OR

Find the value of the determinant

$$\begin{vmatrix} 1 & w & w^2 \\ w & w^2 & 1 \\ w^2 & 1 & w \end{vmatrix}$$

where w is cube root of unity.

Section - C

Note : Attempt any **two** questions. Each question carries $7\frac{1}{2}$ marks. Give answer in detail.

7. Change the equation $x/2 + y/3 = 1$ of a straight line into normal form.
8. Does the line $x + y = 2$ touch the circle $x^2 + y^2 = 2$? If yes, find the point of contact.

9. If $y = x^{x^{\dots\infty}}$
then prove that

$$\frac{dy}{dx} = \frac{y^2}{x(1 - \log y)}$$

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(7)

10. Find the area of the positive quadrant of the ellipse

$$x^2/a^2 + y^2/b^2 = 1.$$

11. Find Inverse of the matrix.

$$\begin{bmatrix} 1 & 2 & 5 \\ 2 & 1 & 0 \\ 3 & 2 & 0 \end{bmatrix}$$

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