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B.Sc. (Hons.) Agriculture (Semester –1st)

INTRODUCTORY MATHEMATICS

Subject Code: BAGRS1169

Paper ID: [21130111]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a) Write the distance formula between two points.
- b) What is the symmetrical form of the straight line?
- c) Write the intercept form of equation of line.
- d) Write the formula of angle between two straight lines.
- e) Integrate the expression: $y = \sqrt{x}$.
- f) Write the definition of radius of circle.
- g) What is the general equation of circle?
- h) Differentiate, $y = 3\sqrt{x}$.
- i) Find the transpose of the matrix $A = [1 \ 3 \ 7 \ 4 \ 9 \ 1 \ 2 \ 7 \ 6]$.
- j) Find the determinant of matrix $A = [2 \ 0 \ 2 \ 3 \ 7 \ 4 \ -2 \ -5 \ 1]$.

Section – B

(5 marks each)

Q2. Find the equation of two straight lines through the origin, each of which intersects the straight lines $\frac{1}{2}(x - 3) = y - 3 = z$ and is inclined at of the angle of 60° to it.

Q3. Find the angle between the two lines $\frac{x}{1} = \frac{y}{0} = \frac{z}{-1}$ and $\frac{x}{3} = \frac{y}{4} = \frac{z}{5}$.

Q4. Determine the radius and the co-ordinates of the circle given by the equation:

$$x^2 + y^2 + 8x - 2y + 8 = 0.$$

Q5. Solve $\int_{\pi/4}^{\pi/2} (3 \sin \sin 2x - 2 \cos \cos 3x) dx$.

Q6. Differentiate the following expression: $y = \frac{4 \sin \sin 5x}{5x^4}$

Section – C

(10 marks each)

Q7. (a) Find the equations of the lines bisecting the angles between the lines

$$\frac{x-3}{2} = \frac{y+4}{-1} = \frac{z-5}{-2} \text{ and } \frac{x-3}{4} = \frac{y+4}{-12} = \frac{z-5}{3}.$$

(b) Find the coordinates of the point that divides the line segment joining the points (2, 5) and (3, - 10) internally in the ratio 3: 2.

Q8. (a) Find the equation of the straight line that has slope $m = 3$ and passes through the point (- 2, - 5).

(b) To find the equation of tangent and normal to the circle $x^2 + y^2 - 3x + 4y - 31 = 0$ at the point (2, 3).

Q9. (a) Find the maxima and minima of the curve $y = 3x^2 - 6x$.

(b) Determine the area enclosed by $y = 2x + 3$, the x-axis and ordinates $x = 1$ and $x = 4$.