North Gauhati College

Department of Mathematics

Sessional Examination 2021

Co-ordinate Geometry and Vector Analysis (E-403)

QUIZ #1

Full Marks: 30 Time Duration: $1\frac{1}{2}$ hour

INSTRUCTIONS TO CANDIDATES

1. This question paper contains **Six (6)** questions and comprises **One (1)** printed page.
2. Answer all the questions.
3. Write your **Name**, **GU Roll No.**, and **Registration Number** .
4. Submit the solutions as a single **PDF** file through the online portal of our college website under section "**Assignments**".

Answer the following questions : [6×5]

1. Choose a new origin (h, k) such that the equation $5x^2 - 2y^2 - 30x + 8y = 0$ may be reduce to the form $AX'^2 + BY'^2 = 1$.
2. Find the angle between the pair of lines given by the equation $ax^2 + 2hxy + by^2 = 0$.
3. If the extremities of a focal chord to the parabola $y^2 = 4ax$ are $\mathrm{A}(at_1^2, 2at_1)$ and $\mathrm{B}(at_2^2, 2at_2)$,then $t_1t_2 = -1$.
4. Show that the lengths of the semi-axis of the conic $ax^2 + 2hxy + by^2 = d$ are $\frac{d}{\sqrt{a+h}}$ and $\frac{d}{\sqrt{a-h}}$.
5. Prove that the S.D between the lines
$$\frac{x-1}{2} = \frac{y+8}{-7} = \frac{z-4}{5} \quad \text{and} \quad \frac{x-1}{2} = \frac{y-2}{1} = \frac{z-6}{-3}$$
is $4\sqrt{3}$.
6. Show that $div(\overrightarrow{u} \times \overrightarrow{v}) = (curl\,\overrightarrow{u}) \cdot \overrightarrow{v} - (curl\,\overrightarrow{v}) \cdot \overrightarrow{u}$.

END OF PAPER