Functions of Several Variable and Differential Geometry 2025 - Minor 2

: Each question carries 4 marks.

1. Define the following:
   (a) parametrized curve and integral curve
   (b) Normal vector field on an n-surface
   (c) Connected subset of $\mathbb{R}^{n+1}$
   (d) Gauss map
2. The set of tangents at a point of a level set forms a vector space.
3. Explain the positive θ-rotation at a point of an oriented 2-surface.
4. Consider the set $S = \{(x, y) : y \geq 0 \text{ and } x(x-2) + y^2 = 0\} \cup \{(x, y) : x = 2 \text{ and } y \in [2, 4]\} \cup \{(x, y) : y = 0 \text{ and } x \in [-2, 0]\} \cup \{(x, y) : y = 0 \text{ and } x \in [4, 6]\}$. Can S be an n-surface? Justify.

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