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Questions No.	1	2	3	Total
Score	30%	30%	40%	100%

Q6.1 Determine an expression for the vorticity of the flow field described by

$$V = -xy^3 \mathbf{i} + y^4 \mathbf{j}$$

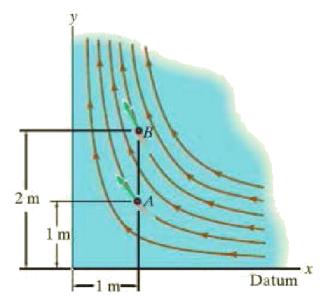
Is the flow irrotational?

Q6.2 The velocity potential for a flow is given by

$$\Phi = \frac{a}{2}(x^2 - y^2)$$

Where a is a constant. Determine the corresponding stream function and sketch the flow pattern.

Q6.3 The velocity field $V = \{-6x\mathbf{i} + 6y\mathbf{j}\} m/s$ defines the two-dimensional ideal fluid flow in the vertical shown in Fig. Determine the volumetric dilatation rate and the rotation of a fluid element located at point B (1m, 2m). If the pressure at point A (1m, 1m) is 250kPa, what is the pressure at point B? Take $\rho = 1200kg/m^3$.



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