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1. The continuity equation is satisfied by [1]

(a) $u = A \sin xy, v = -A \sin xy$

(b) $u = x + y, v = x - y$

(c) $u = 2x^2 + cy, v = 3y^2$

(d) $u = x + 2y, v = 2x + y.$

2. A Pitot-static probe is used to measure the speed of an aircraft flying at 3000 m. If the differential pressure reading is 3 kPa, determine the speed of the aircraft. [5]

2. A pipe of varying sections has areas $9 \text{ cm}^2, 25 \text{ cm}^2,$ and 6 cm^2 at points 1, 2, and 3 respectively. The heights of these points above a datum plane are 90 cm, 60 cm, and 20 cm respectively. The pipe is connected at its upper end to a tank in which the free water surface is 200 cm above the datum plane. Ignoring losses find the discharge through the system in litre/sec. Also find the kinetic energy heads and the pressure heads at each of the above three points. The discharge at the outlet of the pipe is to the atmosphere. [14]

