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| | coefficient of discharge of 0.95. The inlet pressure is 10 kPa (gauge), the vapour pressure of water is 4 kPa (abs) and the local atmospheric pressure is 96 kPa (abs). | |
| (B) | <p>Given the velocity distribution in a laminar boundary layer on a flat plate as</p> $\frac{u}{U} = 2\left(\frac{y}{\delta}\right) - 2\left(\frac{y}{\delta}\right)^3 + \left(\frac{y}{\delta}\right)^4$ <p>where u is the velocity at the distance y from the surface of the flat plate and U be the free stream velocity at the boundary layer thickness δ. Obtain an expression for boundary layer thickness, shear stress, and force on one side of the plate in terms of Reynolds number.</p> | 10 |
| Q. 4(A) | <p>A belt conveyor consists of a flat belt 0.5 m wide which slides at a velocity of 4 m/s parallel to a surface separated by a 6 cm thick layer of oil of viscosity 0.25 Ns/m. Determine</p> <p>(i) the pressure gradient required to cause no shear stress at the belt surface</p> <p>(ii) the average velocity and the discharge of oil to be maintained for the above.</p> | 10 |
| (B) | <p>Following is the velocity potential function for two dimensional irrotational flow in cylindrical coordinates:</p> $\phi = \frac{m \cos \theta}{r}$ <p>Determine the conjugate function (stream function).</p> | 10 |
| Q.5(A) | Draw rough nature of Moody Chart showing different regimes of fluid flow and explain its significance | 05 |
| (B) | What is critical pressure ratio for compressible flow in nozzle? | 05 |