臺灣綜合大學系統112學年度學士班轉學生聯合招生考試試題

科目名稱	流體力學	類組代碼	D36
		科目碼	D3692

※本項考試依簡章規定所有考科均「不可」使用計算機。　　本科試題共計 1 頁

1. (12%) In a steady, incompressible two-dimensional flow field the velocity components read $u = 5y$ in x-direction and $v = 6x$ in y-direction. Please determine the corresponding stream function ψ and velocity potential ϕ.

2. (18%) There are three distinct definitions for the boundary layer thickness: the standard boundary layer thickness, the displacement thickness and the momentum thickness. Please explain their definitions (by text and/or mathematical formulae).

3. (16%) Please list the assumptions while deriving the Bernoulli equations.

4. (16%) What is the difference between the dynamic viscosity and kinematic viscosity? Please also give their units (in SI system).

5. (18%) Please list the incompressible Navier-Stokes equations in Cartesian coordinate system in x-, y-, and z-directions.

6. (20%) As shown in the following figure, a 5.0 m long semi-spherical-shape drainage conduit is filled with water at rest. (density of water: 1,000 kg/m^3)

   (a) Determine the magnitude of horizontal and vertical components of the force of the conduit wall (curve BC) on the fluid, F_H and F_V. (12%)

   (b) Determine the magnitude and line of action of resultant force of the conduit wall (curve BC) on the fluid, F_R. (8%)