國立中央大學98學年度碩士班考試入學試題卷

所別：太空科學研究所碩士班 一般生　科目：流體力學　共 1 頁 第 1 頁

＊請在試卷答案卷（卡）內作答

1. Under what conditions the fluid can be regarded as incompressible? (10%)

2. Show that the fundamental equation for ideal, incompressible fluid (in the absence of gravity) is as follow. (15%)

$$\frac{\partial}{\partial t}(\nabla \times \vec{v}) = \nabla \times (\vec{v} \times \nabla \times \vec{v})$$

3. Write down the governing equation for neutral atmosphere in hydrostatic equilibrium under a gravitational field $\vec{g} = -g\hat{z}$ and derive the pressure profile $p(z)$ for an isothermal gas ($T = const$). (15%)

4. What's gravity wave and how to analyze the propagation of gravity wave on the surface of the ocean? (20%)

5. Obtain the steady solution for flow in a pipe. How to analyze the stability of flow in a pipe? (25%)

6. Explain in details the following terms. (15%)
(a) Mach number; (b) laminar boundary layer; and (c) turbulent wake.

參考用