

淡江大學 98 學年度轉學生招生考試試題

系別：物理學系三年級

科目：理論力學

准帶項目請打「V」

計算機

本試題共 6 大題，壹 頁

1. Given two vectors $\mathbf{A} = A_1\mathbf{i} + A_2\mathbf{j} + A_3\mathbf{k}$, and $\mathbf{B} = B_1\mathbf{i} + B_2\mathbf{j} + B_3\mathbf{k}$. Find the vector product $\mathbf{A} \times \mathbf{B}$. (10%)

2. A particle of mass m has velocity $\mathbf{v} = \alpha/x$, where x is its displacement. Find the force $F(x)$ responsible. (10%)

3. For a system of particles, prove that its total angular momentum about an origin is the sum of the angular momentum of the center of mass about that origin and the angular momentum of the system about the position of the center of mass. (20%)

4. A uniform thin rigid rod of weight W is supported horizontally by two vertical props at its ends as shown in Fig.1. At $t = 0$ one of these supports is kicked out. Find the force on the other support immediately thereafter. (20%)

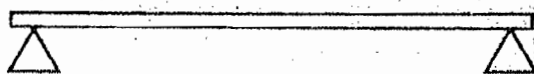


Fig.1

5. The free surface of a liquid is one of constant pressure. If an incompressible fluid is placed in a cylindrical vessel and the whole rotated with constant angular velocity ω , show that the free surface becomes a paraboloid of revolution. (20%)

6. A mass particle moves in a constant vertical gravitational field (g) along the curve defined by $y = ax^2$, where y is the vertical direction. Find the frequency of motion for small oscillations about the position of equilibrium. (20%)