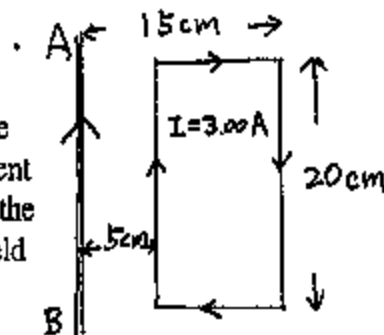


國立中央大學九十一年度碩士班研究生入學試題卷

所別: 天文研究所 不分組 科目: 普通物理 共 1 頁 第 1 頁

1. (25%) What are the orbital speed and the period of revolution of a satellite that orbits the earth in a circular path of radius 12760-km ? (about twice the earth radius), ($g = 9.8 \text{ m/s}^2$, at the earth surface).
2. (25%) An object with height h , mass M , and uniform cross-section A floats upright in a liquid with density ρ . (a) Calculate the vertical distance from the surface of the liquid to the bottom of the floating object at equilibrium. (b) A force is applied and suddenly removed from the top of the object, the object will oscillate up and down in simple harmonic motion. Calculate the period of this motion in terms of the density ρ of the liquid and the mass M and cross-section area A of the object. Neglect the damping due to fluid friction.

3. (25%) The long, straight wire AB carries a current of 15.0A. The rectangular loop whose long edges are parallel to the wire carries a current of 3.00A. Find the magnitude and direction of the net force exerted on the loop by the magnetic field of the wire. ($\mu_0 = 4\pi \times 10^{-7} \text{ Wb/A m}$)



4. (25%) In term of c , (a) what relative velocity between a source and an observer produces a 100% increase in the wavelength of the observed light and (b) what is the speed of a particle if its total energy is twice its rest energy?