臺北市立師範學院

九十四學年度研究所碩士班入學考試試題

所　　別：科學教育研究所(自然科學組物理類)

科　　目：古典物理

考試時間：九十分鐘

總　　分：一百分

※注意：不必抄題，作答時請將試題題號及答案依序寫

在答卷上。(於本試題紙上作答者，不予計分)

1. Find the angular momentum and the rotational kinetic energy of Earth's spin. Assume that Earth is a uniform sphere.
   (Earth's radius = *6400km;* mass=6.0×10^{24} *kg*) (15%)

2. Derive the condition for maximum intensity in two-slit interference experiment. (15%)

3. Describe how a Carnot engine operate? If it operates between *10 ^{0}C* and *35 ^{0}C*, how much energy is required to do a work of *1000J*? (20%)

4. Please describe and derive the well-known Maxwell molecular-velocity distribution function. (15%)

5. Find (a) the partition function for a two-dimentional monoatomic gas, and (b) the equations of state of the gas, by regarding the expression for the Helmholtz function as the fundamental equation. (18%)

6. A point charge q is at a distance d from the xy plane that is the surface of a grounded conductor occupying all space to one side of this plane. The other half of space is a vacuum. Please find the charge density and the electric field for all the space. (17%)