所別： 物理學系生物物理 碩士班 不分組(一般生)　　　　　　　共 1 頁　第 1 頁
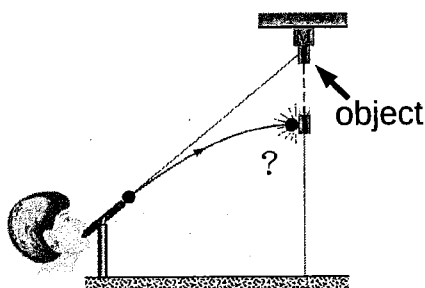
科目： 普通物理

本科考試禁用計算器　　　　　　　　　　　　　　　＊請在答案卷 (卡) 內作答

所有題目皆為問答題

1. (20pts total) (a) (10pts) Please give a physical example for damped oscillations and write down its equation of motion. (b) (10pts) Explain the phenomena of underdamped and overdamped oscillations.

2. (20pts total) Regarding electromagnetism: (a) (10pts) Please write down the Gauss' law and describe its physical meaning. (b) (10pts) Please write down the Ampere's law and describe its physical meaning.

3. (20pts) Please describe the features you know about an optical grating.

4. (20pts) In a typical textbook example about free expansion in thermodynamics, a gas of n moles and an initial volume V is suddenly expanded into volume $2V$ through the removal of the partition. The whole process occurs in a heat-insulated chamber. What is the entropy change of the system?

5. (20pts) There is a famous problem about shooting: As in the following figure, if one aims directly at an object and fires. The object starts to fall (doing free-fall motion with zero initial speed) right at the same moment when the person fires out his bullet. Does the bullet hit the object? Assume there is no air resistance. Please explain why (or why not).

參考用