

系所組別： 製造資訊與系統研究所丙組

考試科目： 物理

考試日期： 0307，節次： 2

※ 考生請注意：本試題 可 不可 使用計算機**Physics (2008)**

1. (30 pts) A 60-ft ladder weighing 100 lbs rests against a wall at a point 48 ft above the ground. The center of gravity of the ladder is one-third the way up the ladder. A 160-lb man climbs halfway up the ladder. Assume that the wall is frictionless. Find the forces exerted by the system (including ladder and man) on the ground and the wall.
2. (20 pts) A uniform magnetic field  $\vec{B}$  of 1.5 webers/meter<sup>2</sup> points horizontally from south to north. A 5.0-MeV proton moves vertically downward through this field. What force will act on it?
3. (20 pts) A coil has an inductance of 5.0 henrys and a resistance of 20 ohms. Apply a 100-volt emf. What energy is stored in the magnetic field after the current has built up to its maximum value?
4. (30 pts) A parallel beam of light with an energy flux  $S$  of 10 watts/cm<sup>2</sup> falls for 1.0 hr on a perfectly reflecting plane mirror of 1.0-cm<sup>2</sup> area. Answer the following questions: (a) (15 pts) What is the momentum delivered to the mirror in this time interval? (b) (15 pts) What force acts on the mirror?