

淡江大學九十學年度日間部轉學生招生考試試題

系別：物理系三年級

准帶項目請打「○」否則打「×」	
計算機	字典
×	×

科目：電 磁 學

本試題共 | 頁

◆ 詳列或敘述計算過程,否則不予計分。

1. A thin insulating rod of length L lies along x axis and carries a uniformly distributed charge $+Q$.
- (a) Find the electric field at a point p along its axis at a distance d from one end as shown in Fig. 1. (15%)
- (b) At large distances from the rod (that is, where $d \gg L$), what is the field of the rod? Give some discussion on your results. (5%)

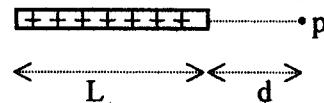


Fig. 1

2. A center hollow disk (inner radius a , outer radius b , as shown in Fig. 2) with uniform surface charge density σ .
- (a) Find the potential at a distance z above the center of the charge distributions. (15%)
- (b) Use the result from (a) to find the electric field at p . (10%)

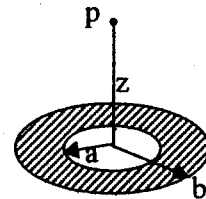


Fig. 2

3. A square loop of wire (side a) lies on a table, a distance s from a very long straight wire, which carries a current I , as shown in Fig. 3.
- (a) Find the flux of \mathbf{B} through the loop. (15%)
- (b) If someone now pulls the loop directly away from the wire, at speed v , what electromotive force is generated? In what direction does the current flow? (12%)
- (c) What if the loop is pulled to the right at speed v , instead of away? (Give the reasons for your answer.) (3%)

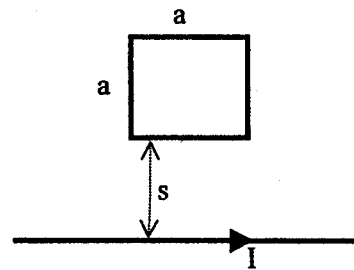


Fig. 3

4. Two semicircular loops of radii a and b have a common center and their ends are joined by straight wires, as shown in Fig. 4.
- (a) What is the resultant magnetic field at the center? (20%)
- (b) Find the magnetic moment of the loop? (5%)

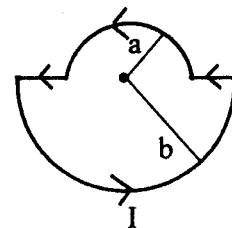


Fig. 4