

# 淡江大學 105 學年度碩士班招生考試試題

17-1

系別：物理學系

科目：普通物理(含近代物理)

考試日期：3月5日(星期六) 第3節

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(請盡量描述你的思路，有助於在未取得正確的結果時，仍可得到部分分數。)

1. A firework(爆竹) is launched straight up(直直向上) at speed 3 m/s. At the peak of its flight, its shell explodes into two pieces. Piece 1 has the velocity 5 m/s horizontally to the east and this speed is three times the speed of piece 2.

(a) What is the ratio of the masses of these two pieces? (7%)

(b) What is the ratio of their kinetic energies right after the explosion? (8%)

2. At the end of a delivery ramp(傳送滑道), a skid pad(止滑墊) exerts a constant force on a package so that the package comes to rest in a distance  $d$ . The time interval required for this package to stop is  $T$ .

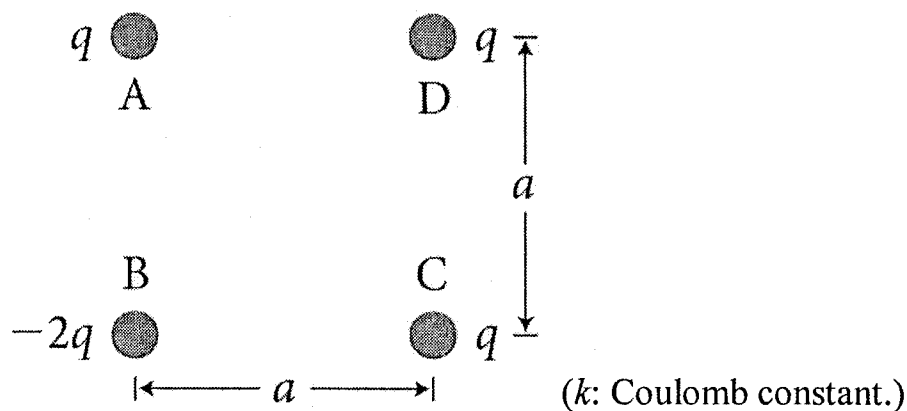
(a) If the ramp is changed so that the same package arrives at the skid pad at a higher speed and the stopping distance is  $4d$ , what is the time interval required for the package to stop? (15%)

(b) With the original(原先的) ramp but replacing the pad by one that requires a distance  $4d$  to stop the same package, what is the time interval required for the package to stop? (10%)

3. Four charged particles are arranged in a square as shown in the figure.

(a) What is the vector sum of the forces exerted on particle D by the other three particles. (15%)

(b) What is the vector sum of the forces exerted on particle C by the other three particles. (20%)



4. (The Photoelectric Effect) Ultraviolet light of wavelength 207 nm causes photoemission from a metal surface. The stopping potential is 2 V. Find:

(a) the work function in eV; (10%)

(b) the maximum speed of the photoelectrons. (15%)

(Planck's constant  $h = 6.63 \times 10^{-34}$  J·s,  $e = 1.6 \times 10^{-19}$  C,  $m_e = 9.11 \times 10^{-31}$  kg,  $c = 3 \times 10^8$  m/s.)