3   A small metal sphere has a mass of 1.0×10^{-4} kg and charge +2.0 nC. It is placed between two parallel, oppositely-charged horizontal plates and directly above an insulated spring as shown in Fig. 3.1. The electric field strength is 1.5×10^5 V m^{-1}.
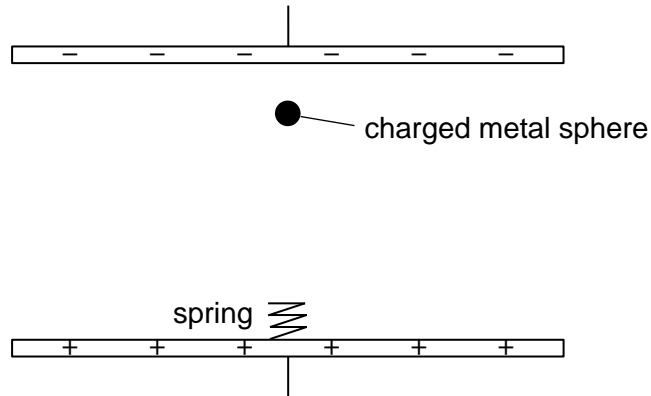

Fig. 3.1

(a)   Determine the magnitude and direction of the electric force on the sphere.

magnitude of electric force = ………………… N

direction = …………………… [3]

(b)   The sphere is released from rest at a height of 0.50 m above the spring. The sphere hits the spring and causes a maximum compression of 0.015 m.

Determine the spring constant.

spring constant = ……………… N m^{-1} [3]