16. Two equal charges $+Q$ are separated by a distance $2d$. Find, approximately $(d > a)$, the minimum radius a of a grounded conducting sphere placed midway between them that would neutralize their mutual repulsion.
    What is the force on each of the two charges if the same sphere, with the radius determined before, is now charged to a potential V?

17. Using the method of images, discuss the problem of a point charge q *inside* a hollow, grounded, conducting sphere of inner radius a.
    Find

    (a) the potential inside the sphere,

    (b) the induced surface-charge density,

    (c) the magnitude and direction of the force acting on q.

    (d) Is there any change in the solution if the sphere is kept at a fixed potential V?
       If the sphere has a total charge Q on its inner and outer surfaces?

18. A grounded conducting plane has a bump in form of a half-sphere with radius a (see Figure). The center of the sphere is in the plane. A point charge q is located at distance $b > a$ on the symmetry axis of the system. Find the potential by the method of image charges.
    Show that the charge q' induced on the half-sphere is of the form

    $$q' = -q \left(1 - \frac{b^2 - a^2}{b \sqrt{a^2 + b^2}} \right) .$$