(22-37)

(a) Find \( E \) (magnetic field) in these regions:

1. \( 0 < r < R \)
2. \( R < r < 2R \)
3. \( r > 2R \)

(1) Conducting sphere (isolated) - charge on surface is inside sphere \( E = 0 \) for \( 0 < r < R \) (no charge enclosed).

(2) Charge enclosed is \( Q \) so for \( r > 2R \), \( E = \frac{1}{4\pi\varepsilon_0} \frac{Q}{r^2} \).

(3) For \( r > 2R \), charge enclosed is \( 2Q \) so

\[ E = \frac{1}{4\pi\varepsilon_0} \frac{2Q}{r^2} \]

Graphically:

\[ E \]

\[ R \quad 2R \]

Outward pointed