2) $r > R$

$$V_2 = -\int \frac{E}{2}\, dr = -\int \frac{q}{4\pi\varepsilon_0 r^2} dr - \int \frac{R^2\sigma}{r^2\varepsilon_0} dr$$

$$V_2 = \frac{q}{4\pi\varepsilon_0 r} + \frac{R^2\sigma}{\varepsilon_0 r} + C_2$$

Calcul de C_1, C_2 ?

1) $V_2(r \to +\infty) = 0$

2) $V_2(r = R_+) = V_1(r = R)$

$V_2(r \to +\infty) = 0 \Rightarrow C_2 = 0$

$V_2(r = R) = V_1(r = R)$

$$\frac{q}{4\pi\varepsilon_0 R} + \frac{R^2\sigma}{\varepsilon_0 R} = \frac{q}{4\pi\varepsilon_0 R} + C_1$$

$$C_1 = \frac{R\sigma}{\varepsilon_0}$$

Donc :
$$\begin{cases} V_1 = \dfrac{q}{4\pi\varepsilon_0 r} + \dfrac{R\sigma}{\varepsilon_0} \\ V_2 = \dfrac{q}{4\pi\varepsilon_0 r} + \dfrac{\sigma R^2}{\varepsilon_0 r} \end{cases}$$