$$\varphi_i(x, y; t) = -2q\omega \exp\{-(\omega^2/g)d_0\} \exp\{-(\mu\omega/g)x\}$$
$$\exp\{(\omega^2/g)y\} \exp\{-i[(\omega^2/g)x - \omega t]\}$$
$$+\frac{2}{\pi} iq\omega \left[\int_0^\infty \frac{e^{-is}}{s} \sin d_0 s \sin y s ds\right.$$
$$\left.-\int_0^\infty \frac{e^{-is}}{s^2+(\omega^2/g)^2}\left\{s\cos(d_0-y)s-\left(\frac{\omega}{g}\right)^2 \sin(d_0-y)s\right\}ds\right]e^{i\omega t} \quad \cdots\cdots(41)$$