*Relationship between conduction and displacement currents.* If the conduction current density at a point of a lossy medium of parameter $\epsilon$, $\mu_o$ and $\sigma$ is given by $J(t) = J_o \sin \omega t$, the displacement current density at that point is of the following form ($J_o$, $\omega$, and $J_{do}$ are positive constant):

(A) $J_d(t) = J_{do} \sin \omega t$.
(B) $J_d(t) = -J_{do} \sin \omega t$.
(C) $J_d(t) = J_{do} \cos \omega t$.
(D) $J_d(t) = J_{do}$.
(E) $J_d(t) = 0$.
(F) None of the above.

*Solution:* (C)
*Answer:* (C)