Open-circuited loop around a solenoid. An air-filled infinitely long solenoidal coil with a circular cross section of radius a carries a slowly time-varying current. The magnetic flux through a surface spanned over one turn of the coil is $\Phi(t)$. An open-circuited circular wire loop of radius b ($b > a$) is placed coaxially around the solenoid, as shown in Fig.Q6.4. The voltage between the terminals of the loop, for the reference orientation of the terminals in the figure, equals

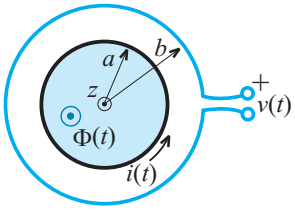

Figure Q6.4 Open-circuited loop around an air-filled infinitely long solenoid with a slowly time-varying current (cross section of the structure); for Question 6.13.

(A) $v(t) = d\Phi/dt$.
(B) $v(t) = -d\Phi/dt$.
(C) $v(t) = (b/a)^2 d\Phi/dt$.
(D) $v(t) = -(b/a)^2 d\Phi/dt$.
(E) $v(t) = 0$.

Solution: (A)
Answer: (A)