With respect to visible light, an interstellar cloud of atomic hydrogen gas is

A) opaque

B) transparent

C) opaque for most wavelengths but transparent for a some wavelengths

D) transparent for most wavelengths but opaque for some wavelengths

E) I haven't the faintest idea

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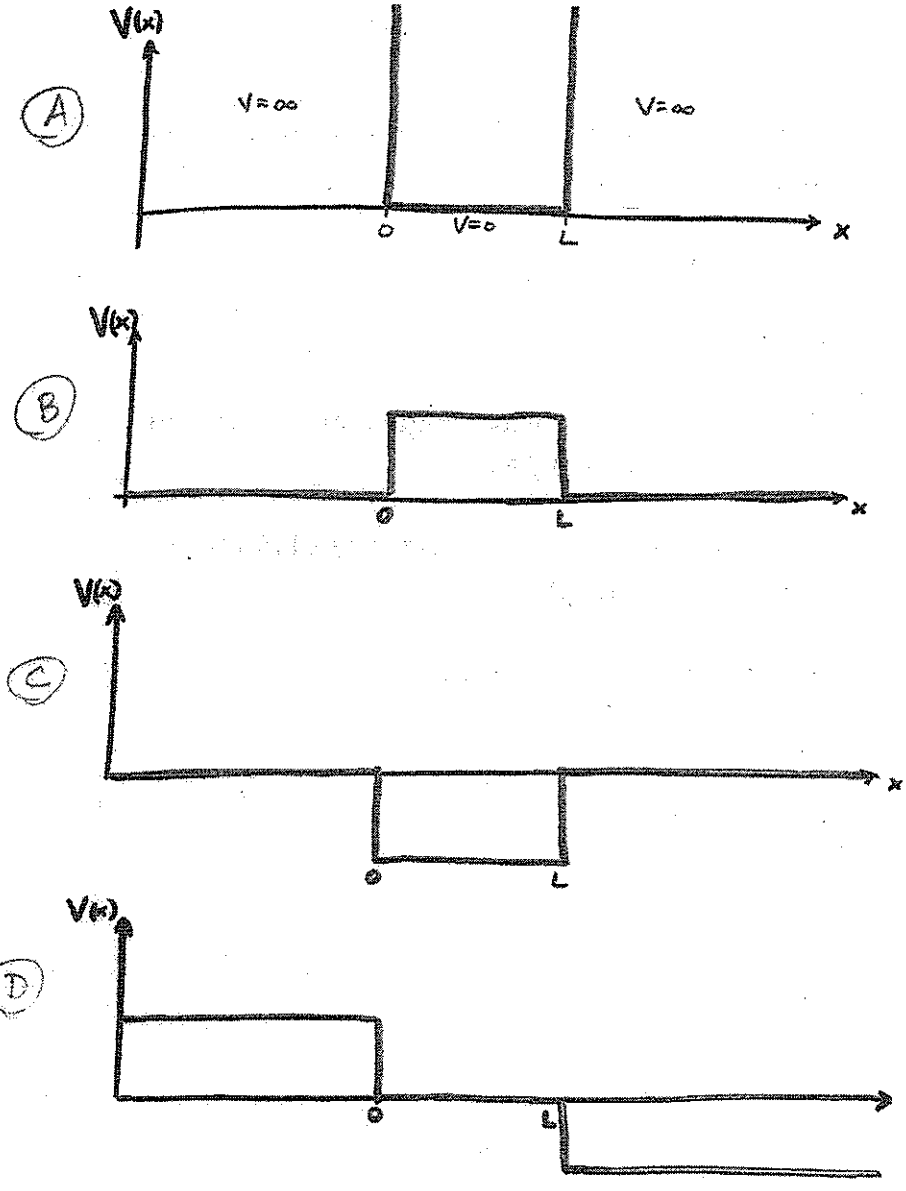
→ will absorb light (i.e. be opaque) only if $hf = E_a - E_b$ for 2 energy levels of hydrogen.

Which of the pictures best represents the potential energy function for an electron in a thin one-dimensional wire of length L?



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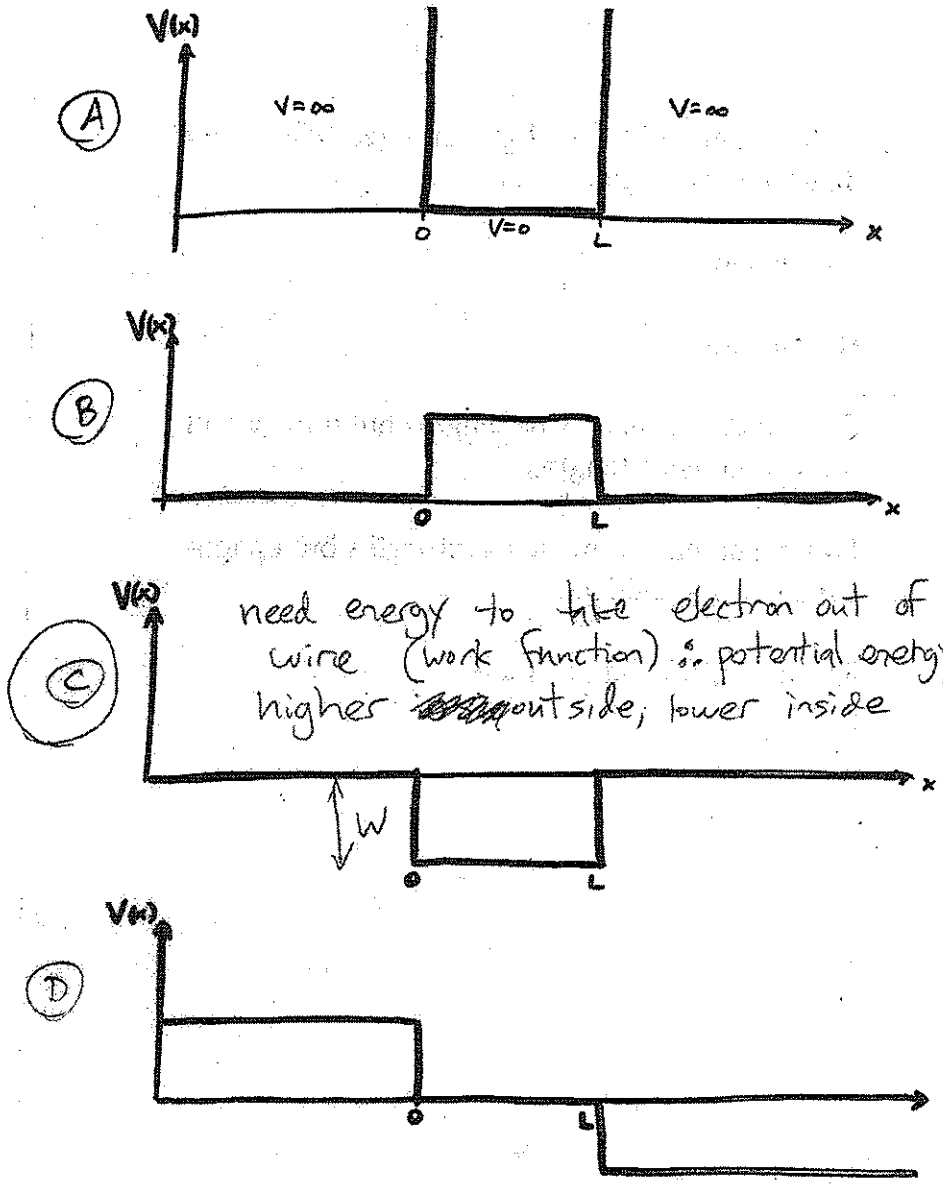

Is the electron wavefunction shown an energy eigenstate?

A) Yes

B) No

C) It is at certain times but not at other times

Probability density is changing with time, so not a STATIONARY STATE. All energy eigenstates are stationary, since for $\psi(x,t) = \psi_E(x) e^{-i\frac{E}{\hbar}t}$, we get

$$P(x,t) = |\psi(x,t)|^2 = |\psi_E(x)|^2.$$

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