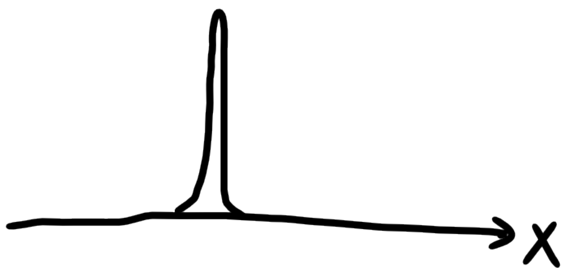
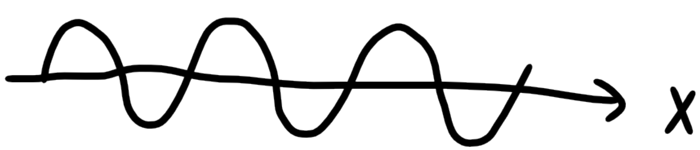
Which of the following wavefunctions represents an energy eigenstate?

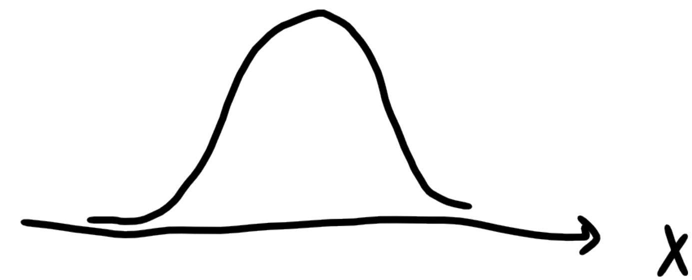
A)



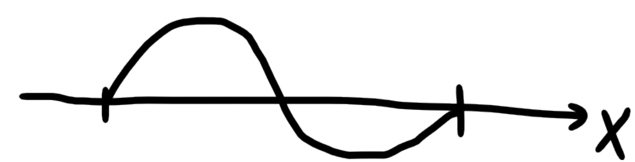
B)



C)



D)



E) not enough information to tell

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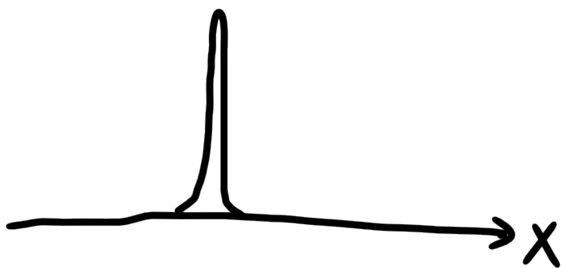
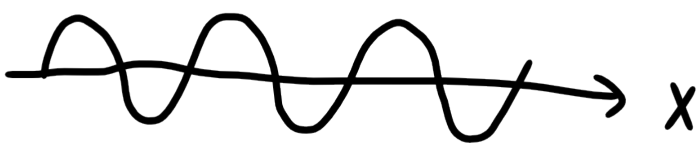
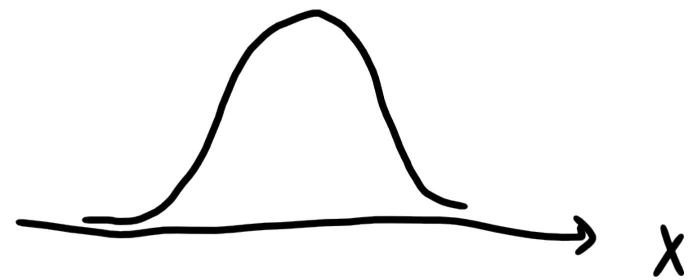


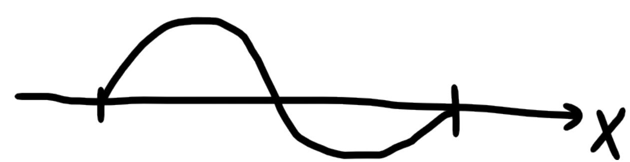
B)



C)



D)



need to know the potential to find the energy eigenstates - not given in the question!

E) not enough information to tell

In units of 13.6 eV / h, a hydrogen atom in a ground state can absorb photons with frequency

A) 3/4

B) 8/9

C) 1/4 - 1/9 = 5/36

D) A and B but not C

E) A, B and C

In units of 13.6 eV / h, a hydrogen atom in a ground state can absorb photons with frequency

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D) A and B but not C

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The electron can go from state with n = 1 to n=2 (A) or n=3 (B), but it cannot go from n=2 to n=3 because it starts out in n=1

In units of 13.6 eV / h, a hydrogen atom in an excited state can emit photons with frequency

A) 3/4

B) 8/9

C) 1/4 - 1/9 = 5/36

D) A and B but not C

E) A, B and C

In units of 13.6 eV / h, a hydrogen atom in an excited state can emit photons with frequency

A) 3/4

B) 8/9

C) 1/4 - 1/9 = 5/36

D) A and B but not C

E) A, B and C

A - transition from n=2 to n=1
B - transition from n=3 to n=1
C - transition from n=3 to n=2
ALL OK

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

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

A) opaque

it only absorbs light at the special wavelengths determined by the quantized energy levels

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

In the infinite square well, inside, away from the walls, the force acting on the electron

A) pushes it towards the nearest wall

B) pushes it away from the nearest wall

C) is zero

D) changes with the wavefunction

E) is inifinite

In the infinite square well, inside, away from the walls, the force acting on the electron

A) pushes it towards the nearest wall

B) pushes it away from the nearest wall

C) is zero

D) changes with the wavefunction

E) is inifinite

no force inside the wire - the potential is flat there

The wavefunction of the infinite square well, $\sin(n\pi x/L)$, can be written in terms of free particle complex waves as

A) $e^{in\pi x/L} + e^{-in\pi x/L}$

B) $e^{in\pi x/L} - e^{-in\pi x/L}$

C) $(e^{in\pi x/L} + e^{-in\pi x/L})/2$

D) $(e^{in\pi x/L} - e^{-in\pi x/L})/(2i)$

E) $(e^{in\pi x/L} + e^{-in\pi x/L})/(2i)$

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E) $(e^{in\pi x/L} + e^{-in\pi x/L})/(2i)$

use $\exp(iw) = \cos(w) + i \sin(w)$ and $\exp(-iw) = \cos(w) - i \sin(w)$