Physics 133 Sample Quiz                                        Name_____

Recitation Instructor (circle one):   Able    Baker    Charlie    Easy    Fox    George

$h = 6.63 \times 10^{-34}$ J s $= 4.14 \times 10^{-15}$ eV s                 $\hbar = 1.05 \times 10^{-34}$ J s $= 6.58 \times 10^{-16}$ eV s

$c = 3.00 \times 10^{8}$ m/s                                           $hc = 1240$ eV  nm                                    $e = 1.60 \times 10^{-19}$ C

$m_e = 9.11 \times 10^{-31}$ kg                                      $m_e c^2 = 511$ keV

## QUIZ #7

**(1)** A beam of neutrons ($m_n = 1.67 \times 10^{-27}$ kg and $m_n c^2 = 940$ MeV ) travels through a slit of width 10.0 nm.  The neutrons then hit a 2.00 cm wide screen a distance 10.0 m away.

What is the largest speed the neutrons can have so that all parts of the screen along its width are eventually hit by a neutron?

**(2)** Using the same apparatus as in (1) but with electromagnetic radiation, is there a photon energy so low that parts of the screen will never be hit by a photon? If so, find the lowest energy so that all parts are hit.

**(3)** Using the same apparatus as in (1) but with electromagnetic radiation, is there a photon energy so high that parts of the screen will never be hit by a photon? If so, find the highest energy so that all parts are hit.