FINAL EXAM Practice Problems ANSWERS

1. C (Other choices depend on wave nature of light)

2. D

3. D ($\gamma = \frac{1}{\sqrt{1-0.86^2}} = 1.96 \quad L = \frac{L_0}{\gamma} = \frac{1m}{1.96} = 0.51m$)

4. C ($E = hf = \frac{hc}{\lambda} = \frac{1240eV}{155nm} = 8eV$)

5. A

6. B ($K_{max} = hf - \varphi = 8eV - 6.35eV = 1.65eV$)

7. B ($\Delta\lambda = \frac{h}{mc}(1-\cos\theta)$ **= 5.952 x 10^{-4} nm**

8. D ($\lambda_{deBroglie} = h/p$)

9. C ($\Delta x \sim \frac{h}{\Delta p} = \frac{h}{m\Delta v}$ ➔ **particle with the lesser mass has the greater uncertainty in position)**

10. C

11. A

12. D (Convex mirror has a negative focal length. Using the mirror equation, we have

$\frac{1}{f} = \frac{1}{p} + \frac{1}{q}$ ➔ $\frac{1}{-30} = \frac{1}{30} + \frac{1}{q}$ ➔ ***q* = -15.** ***q* < 0, so image is virtual, i.e. behind the mirror)**

13. B. (Use lensmaker's equation, $\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$ **with n = 1.5, R_1 = 5 cm, R_2 = infinity**

14. A [Convex mirror is diverging ("convenience store security mirror"). Diverging mirrors and diverging lenses cannot form real images.]

15. C ($B = \frac{\mu_0 I}{2R}$ ➔ $I = \frac{2RB}{\mu_0}$. **Must convert R to meters.)**