

Modern Physics Review Sheet

1. Which 2 experiments proved **light is a particle**? _____
2. What is a **photon**?

3. Which **color** of light has the **greatest energy**? _____

Smallest energy? _____ Why? _____

4. What is the **energy** of a photon with a **frequency** of 6.0×10^{14} Hz ?

5. If the **frequency** of light is **decreased** how does that affect its **energy**? _____

Show the equation that relates these 2 variables _____

Sketch a plot of these 2 variables

5a) What is the relationship between the **energy** of a photon and its **wavelength**?

_____ Sketch a plot of these 2 variables

6. What is the relationship between the **wavelength** of a particle and its **momentum**?

Sketch plot

7. Why is it difficult to observe the **wave behavior** of a moving **basketball**?

8. What did **Rutherford's experiment** tell us about the atom?

9. What does an electron in an atom have to do to **lose energy**? Go up or down an energy level.

9a) The **lowest energy** an electron can be in is called the _____ state.

10. How much **energy** does it take to ionize an electron of hydrogen in the 1st energy level? _____

How much energy does it take to **ionize** an electron in the **B level in mercury**?

11. How much energy must an electron in **hydrogen** have to absorb to go from the **3rd to the 4th energy level**?

12. What angle will an alpha particle come back at if it hits straight on? _____

12a) How will the deflection angle change as an alpha particle comes closer to a nuclei?

13. Draw the path of an alpha particle that comes near the nucleus. Now draw the path of an alpha particle that comes closer to the nucleus.

14. What is an "electron cloud" in the new model of the atoms?

15. What is the binding energy of the atom and where does it come from?

16. Describe the force that holds the nucleus together.

17. How much energy can you get when 2 kg of mass is converted to energy?

17a) How much energy can you get when 2 universal mass unit of mass is converted to energy?

17b) How much energy can you get when a neutron is converted to energy?

18. What energy can an atom with the following energy levels absorb to change energy levels? -20 , -15 , -2 (remember to remove the negatives before subtracting)

19. Name three quarks from your reference table.

20. Give two examples of baryons.

21. How many different amounts of energy can an atom with 3 energy levels emit?
a) how many different colors? _____ b) how many different photons? _____