Name: _____

Period: _____

Light and Color Basics

6.1

1. How can you PROVE that light is a wave?

   It can be reflected.

2. How can you PROVE that light is a particle?

   It can travel without a medium

3. What is the speed of light? 3×10^{8} m/s

4. What variable do we use for the speed of light? c

5. When energy goes into an atom is light produced? no → only when e's fall E → out

6. What is the speed of radio waves with a wavelength of 4.2 m?

   c

7. What do we call a prism spreading out light into its colors?

   dispersion

Use the information at the right for the following:

8. A. Convert 400 nm to m. 400×10^{-9} m or 4.0×10^{-7}
   B. What is its frequency? $V=\lambda\cdot f$ $f=\frac{V}{\lambda}=\frac{3\times10^{8}\text{ m/s}}{4\times10^{-7}}=7.5\times10^{14}$ Hz

400×10^{-9} m | 1 m

1×10^{-9} nm

1 MHz = 1×10^{6} Hz
So. 45 MHz = 45×10^{6} Hz

1 nm = 1×10^{-9} m
So. 340 nm = 340×10^{-9} m

9. A. Convert 90 MHz to Hz. $90=9\times10^{1}\times10^{6}$
   B. What is its wavelength? $\lambda=\frac{3\times10^{8}\text{ m/s}}{9\times10^{7}\text{ Hz}}$ $\lambda=9\times10^{7}$ Hz. 3.3 m

10. Find the frequency of light rays that are 650 nm long.

    $f=\frac{V}{\lambda}$ $\frac{3\times10^{8}\text{ m/s}}{650\times10^{-9}\text{ m}}=4.62\times10^{14}$ Hz

11. What do scientists call all light, both visible and invisible?

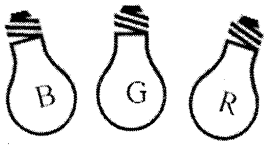
    EM Spectrum

12. Which has higher frequency: red or blue light?

    blue

13. Which has a longer wavelength: red or blue light?

    red



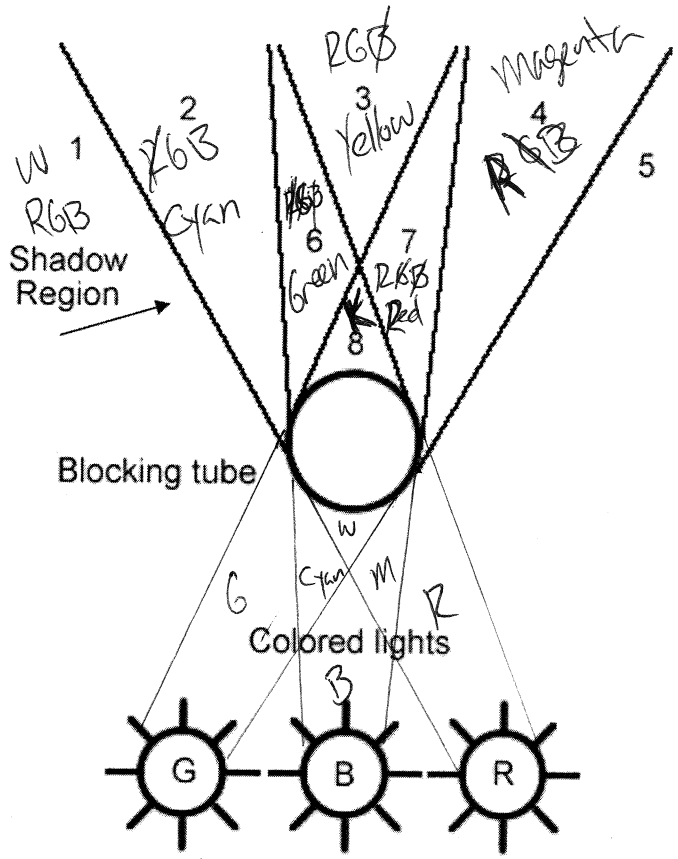
White

What color?

14. Three light bulbs are above a circle.
    A. If all of them are off, what color is the circle? Black
    B. What color if all are on? White
    C. What color if B and R are on? Magenta
    D. Which have to be on to produce magenta? B & R
    E. Which have to be on to produce green? G
    F. Which have to be on to produce yellow? R & G
    G. Which have to be on to produce black? none

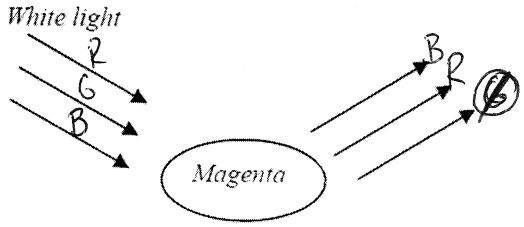
15. Is the blocking tube adding or subtracting light?

16. Fill in the colors for the different regions and write RGB for each. Use a slash thru a letter to show a color that is missing.
Ex: RGB means R and G are present, but B is blocked.



17. In CMYK.
A. What is K? Black
B. How do you make yellow? Yellow
C. How would you make red? M + Y
D. How would you make white?
none, page is already white

18. White light shines onto a patch of magenta paint.
A. What lights make up magenta? R+B
B. For you to see magenta, what lights must be reflected? R+B
C. What color must NOT be reflected? G
D. So, what color is absorbed by magenta? G



19. What color is absorbed by cyan?
Red Cyan = RGB

20. A blue filter is put in front of a red light.
A. What color does it look like? black
B. Why? only blue gets through filter

21. A. The phosphorus pad (glow-in-the-dark) was what color? creepy green
B. What color was it when blue light was shined on it? creep green
C. Why?
each element give off certain Colors