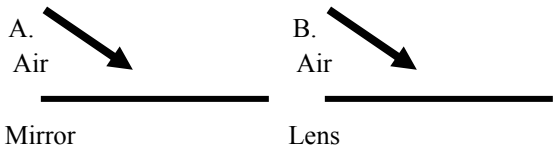
PreAP: Due: Mon., May 22 (Assigned: Thurs., May 18)
Reg. Due Tues., May 23 (Assigned Fri., May 19)

Final Review: Light, Optics, Harmonic Motion

1. A) What is the speed of light? B) Give the one thing faster than light:
2. If the image seems to be on the opposite side of the mirror from the object is it real or virtual?
3. If the image seems to be on the same side of the mirror as the object is it real or virtual?
4. If the image seems to be on the same side of the lens as the object is it real or virtual?
5. If the image seems to be on the opposite side of the lens from the object is it real or virtual?
6. Convergent or Divergent: _____ Concave mirror; _____ Convex lens; _____ Convex mirror; _____ Concave lens?
7. Do convergent devices have a real or virtual focal point?
8. Are the following + or –?

A. ____ The distance to the object?
B. ____ The focal length of a concave mirror?
C. ____ Image distance from a convex mirror?
D. ____ h' if the image is inverted.
E. ____ The focal length of a convex lens?
F. ____ The left side of a mirror?
G. ____ Image distance from a concave mirror (usually)
H. ____ The right side of a lens?
I. ____ q if the image appears to the left of a mirror.
J. ____ The focal length of a convex mirror?
K. ____ Image distance from a concave lens?
L. ____ The left side of a lens?
M. ____ The focal length of a concave lens?
N. ____ The right side of a mirror?
O. ____ Image distance from a convex lens (usually)?
P. ____ q if the image is inverted.

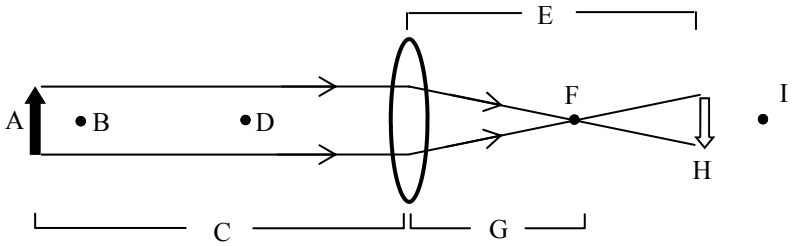
9. Show what will happen for graphics A and B on the right (the lens is made from glass).



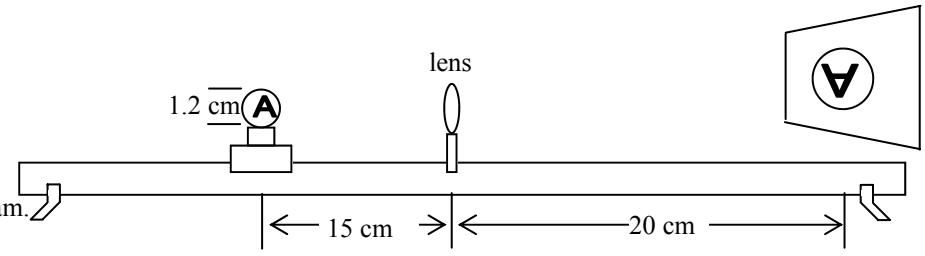
10. In graphics A the light will _____.
11. In graphics B the light will _____.
12. Is light a particle or a wave (and why)?

13. What do the letters stand for on the diagram? (*One is repeated*)

A = _____
B = _____
C = _____
D = _____
E = _____
F = _____
G = _____
H = _____
I = _____



14. Label p, q, h, and h' on the diagram.
15. A) Calculate the focal length from the diagram.

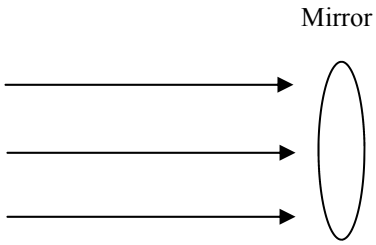


B) Find the magnification.

C) Find the height of the image.

D) Is the image real or virtual?

16. A person stands in front of a flat mirror looking at a chair placed 2 meters in front of the mirror.
    A) What is the focal length of the mirror?
    B) Does the image appear inside or in front of the mirror?
    C) Is the image real or virtual?
    D) Could you project this image onto a screen?
    E) Where does the image of the chair appear (include a number).
17. What kind of mirror is shown at the right?
18. Draw where the three rays will go.
19. Draw and label where the focal point is.



20. A) Is it a real or virtual focal point? B) Will it create a real or virtual image?
21. A) Is it divergent or convergent? B) Will it magnify or reduce?

Final Review: Light, Optics, Harmonic Motion

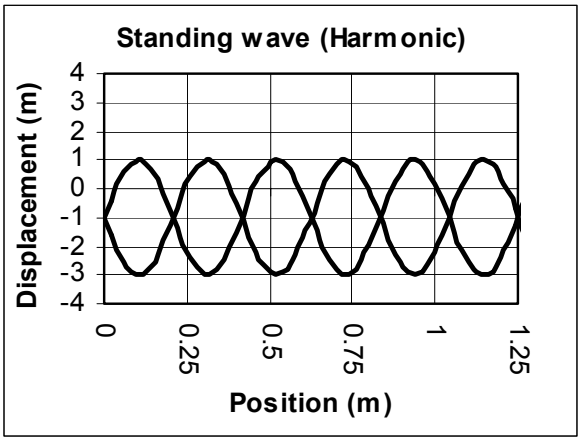
22. Use the standing wave at the right to answer the following.
    A. Find the standing wave's wavelength.

    B. If this was a sound wave, find its frequency.

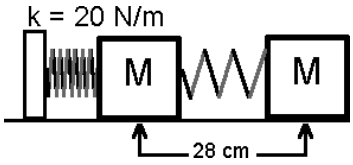
    C. Can we hear it's frequency?

    D. Amplitude = _____ E. Period = _____
    F. Where will it come to rest?
    I. Find the fundamental frequency for this space.

    J. Find the wavelength of the fundamental for the space on graph 1.



23. If it has a frequency of 2.5 sec, find the value of M.



A spring moving from side-to-side

24. Spring's amplitude: _____; During 1 cycle it will travel how far: _____.
25. If you increase its amplitude, how will its period change?
26. The number of cycles per second is known as the _____.
27. The number of seconds per cycle is known as the _____.
28. The maximum displacement or disturbance from its equilibrium position is known as the _____.
29. The distance from one point on a wave to the same point on the next wave is known as the _____.
30. The part of harmonic motion that repeats over and over is called the _____.
31. From the graphic at the right. A) What harmonic is it? B) Mark the antinodes.
    C) Mark the waveform on the graphic. D) Mark one wavelength.
    E) If I tightened the string, would the frequency go up or down?
    F) Find the fundamental frequency for this space.

240 Hz

32. Which affects the period of a pendulum: Amplitude; Mass; Length?
33. You need to make the period of the pendulum longer. What do you do?
34. Faster, slower, equal?
    A) Two springs with equal masses on them, the one with the smallest spring constant (k) has the _____ period.
    B) Two springs with equal spring constants, the one with the heaviest object on it has the _____ period.
    C) Two spring with equal spring constants and masses, the one with the greatest amplitude has the _____ period.
35. Harmonic Motion or not?
    A) ____ A bouncing ball. B) ____ A spring bouncing. C) ____ A water wave. D) ____ Doing jumping jacks.
36. A) Does sound travel faster or slower in denser materials?
    B) So sound travels faster in: solids, liquids, or gases?
    C) How fast does sound travel in air?
    D) How fast does sound travel in space?
37. You yell into a canyon and your echo comes back to you in 3.6 seconds. How wide is the canyon?

38. Which has a higher pitch (higher note)?

    A) High frequency or low frequency?
    B) Harmonic 2 or harmonic 6?
    C) A tight string or a loose string?
    D) Blowing into an empty bottle or half-empty bottle?
    E) A short string or a long string?

39. If a wave has a frequency of 3,500 Hz and a speed of 200 m/s, find its wavelength.