MisConceptual Questions

1. Suppose you are standing about 3 m in front of a mirror. You can see yourself just from the top of your head to your waist, where the bottom of the mirror cuts off the rest of your image. If you walk one step closer to the mirror
(*a*) you will not be able to see any more of your image.
(*b*) you will be able to see more of your image, below your waist.
(*c*) you will see less of your image, with the cutoff rising to be above your waist.

2. When the reflection of an object is seen in a flat mirror, the image is
(*a*) real and upright.
(*b*) real and inverted.
(*c*) virtual and upright.
(*d*) virtual and inverted.

3. You want to create a spotlight that will shine a bright beam of light with all of the light rays parallel to each other. You have a large concave spherical mirror and a small lightbulb. Where should you place the lightbulb?

(*a*) At the focal point of the mirror.

(*b*) At the radius of curvature of the mirror.

(*c*) At any point, because all rays bouncing off the mirror will be parallel.

(*d*) None of the above; you can't make parallel rays with a concave mirror.

4. When you look at a fish in a still stream from the bank, the fish appears shallower than it really is due to refraction. From directly above, it appears

(*a*) deeper than it really is.

(*b*) at its actual depth.

(*c*) shallower than its real depth.

(*d*) It depends on your height above the water.

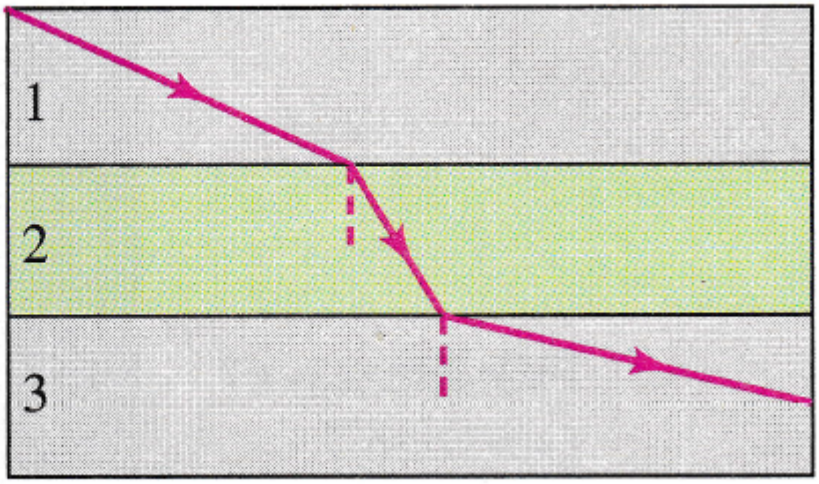

FIGURE 23–51
MisConceptual Question 5.

5. Parallel light rays cross interfaces from medium 1 into medium 2 and then into medium 3 as shown in Fig. 23–51. What can we say about the relative sizes of the indices of refraction of these media?
(*a*) $n_1 > n_2 > n_3$.
(*b*) $n_3 > n_2 > n_1$.
(*c*) $n_2 > n_3 > n_1$.
(*d*) $n_1 > n_3 > n_2$.
(*e*) $n_2 > n_1 > n_3$.
(*f*) None of the above.

6. To shoot a swimming fish with an intense light beam from a *laser gun*, you should aim
(*a*) directly at the image.
(*b*) slightly above the image.
(*c*) slightly below the image.

7. When moonlight strikes the surface of a calm lake, what happens to this light?

(*a*) All of it reflects from the water surface back to the air.
(*b*) Some of it reflects back to the air; some enters the water.
(*c*) All of it enters the water.
(*d*) All of it disappears via absorption by water molecules.

8. If you shine a light through an optical fiber, why does it come out the end but not out the sides?

(*a*) It does come out the sides, but this effect is not obvious because the sides are so much longer than the ends.
(*b*) The sides are mirrored, so the light reflects.
(*c*) Total internal reflection makes the light reflect from the sides.
(*d*) The light flows along the length of the fiber, never touching the sides.

9. A converging lens, such as a typical magnifying glass,

(*a*) always produces a magnified image (taller than object).
(*b*) always produces an image smaller than the object.
(*c*) always produces an upright image.
(*d*) always produces an inverted image (upside down).
(*e*) None of these statements are true.

10. Virtual images can be formed by
(*a*) only mirrors.
(*b*) only lenses.
(*c*) only plane mirrors.
(*d*) only curved mirrors or lenses.
(*e*) plane and curved mirrors, and lenses.

11. A lens can be characterized by its *power*, which
(*a*) is the same as the magnification.
(*b*) tells how much light the lens can focus.
(*c*) depends on where the object is located.
(*d*) is the reciprocal of the focal length.

12. You cover half of a lens that is forming an image on a screen. Compare what happens when you cover the top half of the lens versus the bottom half.
(*a*) When you cover the top half of the lens, the top half of the image disappears; when you cover the bottom half of the lens, the bottom half of the image disappears.
(*b*) When you cover the top half of the lens, the bottom half of the image disappears; when you cover the bottom half of the lens, the top half of the image disappears.
(*c*) The image becomes half as bright in both cases.
(*d*) Nothing happens in either case.
(*e*) The image disappears in both cases.

13. Which of the following can form an image?

(*a*) A plane mirror.
(*b*) A curved mirror.
(*c*) A lens curved on both sides.
(*d*) A lens curved on only one side.
(*e*) All of the above.

14. As an object moves from just outside the focal point of a converging lens to just inside it, the image goes from _____ and _____ to _____ and _____.

(*a*) large; inverted; large; upright.
(*b*) large; upright; large; inverted.
(*c*) small; inverted; small; upright.
(*d*) small; upright; small; inverted.

1) A
2) C
3) A
4) C
5) E
6) A
7) B
8) C
9) E
10) E
11) D
12) C
13) E
14) A