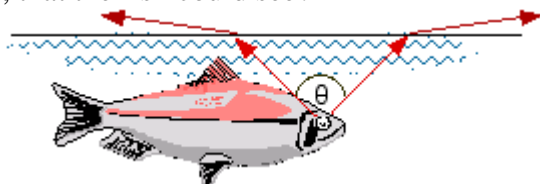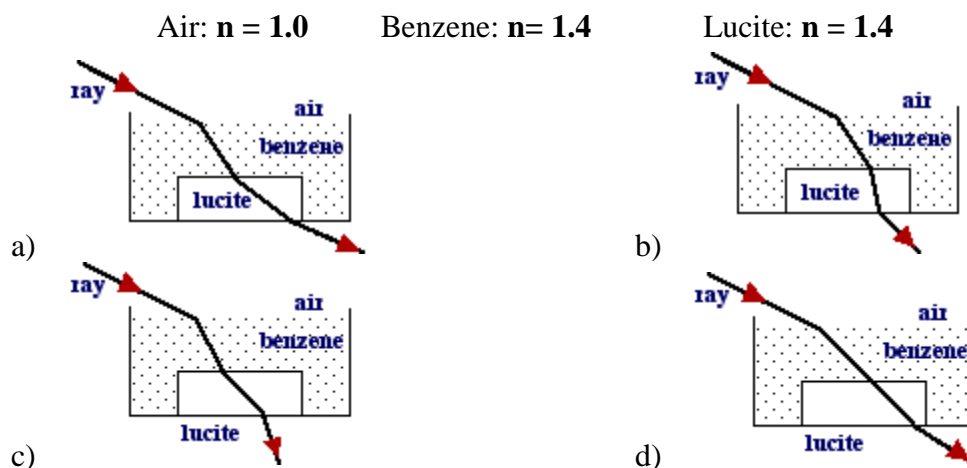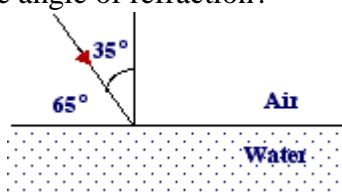1. When fish look up at the surface of a smooth lake, the surface appears dark except for a circular area directly above it. The refractive index of water is 1.33 and of air is 1.0. What is the maximum angle of view, θ, that the fish could see?

a) 97.5°
b) 1.50°
c) 48.8°
d) 0.752°
e) Unable to calculate with the given information.

2. Which diagram shows the path that a ray of laser light will travel as it passes through air, benzene, lucite and back into air? The refractive indexes are listed below:

Air: **n = 1.0**   Benzene: **n= 1.4**   Lucite: **n = 1.4**
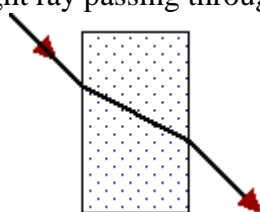

a)

b)

c)

d)

3. A beam of light travels from air to water as shown in the diagram below. If the index of refraction is 1.33 then calculate the angle of refraction?

a) 26°
b) 43°
c) 35°
d) total internal reflection
e) insufficient data

4. If the speed of light in a vacuum is **c**, then the speed of light in a medium with an index of refraction of 2 will be
   a) 4**c**
   b) 2**c**
   c) **c**/2
   d) **c**/4

5. Light leaves a slab of plastic (index of refraction = 2.0) with a refracted angle of 0°. The angle of incidence is
   a) 90°
   b) 0°
   c) 45°
   d) 30°

6. The following diagram illustrates a light ray passing through a plastic block.

   This is an example of
   a) Resonance
   b) Diffraction
   c) Reflection
   d) Refraction

7. Light passes from air into water at 45.0° to the normal. If the index of refraction of water is 1.33, find the angle of refraction (in degrees).

8. When light passes from a region with a higher index of refraction to a region with a lower index of refraction, at an angle of incidence that is greater than the critical angle, _____ reflection occurs.

Use the following information to answer the next 3 questions.

A beam of light passing through a flint glass is incident on water. The index of refraction of water is 1.33 and the index of refraction of flint glass is 1.62.

9. What is the critical angle (in degrees, to the nearest angle) of light that passes from the flint glass to water?

10. What happens to the path of light if the angle of incidence is 60°?
    (total internal reflection, total internal refraction, refraction)

11. What happens to the value of the critical angle if the flint glass is replaced by a diamond? The index of refraction of diamond is 2.42.
    (increases, decreases, stays the same)