Index of Refraction & Snell's Law Questions

1. Calculate the speed of light for the following mediums:
    a. Water (n=1.33);
    b. Diamond (n=2.42)
    c. Plexiglas (n=1.51)

2. Calculate the refractive index for a substance if the speed of light in that medium is
    a. 2.1×10^8 m/s
    b. 1.5×10^8 m/s

3. Calculate the speed of light in a hypothetical material you have discovered and named in honour of yourself. Its refractive index is 0.90.

4. Calculate the angle of refraction for light as it passes from air to each of the mediums;
    a. Water (n=1.33);
    b. Diamond (n=2.42)
    c. Plexiglas (n=1.51)

    At an incidence angle of 25°.

5. An angle of incidence of 20° in water results in an angle of refraction of 15°.
    a. Is the second medium more of less optically dense than the first medium?
    b. Find the n of the second medium
    c. Find the speed of light in each medium
    d. Repeat this question for an angle of refraction of 25°

Media	Index of Refraction
Vacuum	1.00
Air	1.0003
CO_2	1.0005
Water	1.33
Alcohol	1.36
Pyrex glass	1.47
Plexiglass	1.49
Table Salt	1.51
Flint Glass	1.61
Sapphire	1.794
Diamond	2.42
Ruby	1.779

Snell's Law Worksheet 1

Part A

1.When light passes from air into water at an angle of 60° from the normal, what is the angle of refraction? (40.6°)

2.When light passes from air into water at an angle of 30° from the normal, what is the angle of refraction? (22.1°)

3.When light passes from water into diamond at an angle of 45° from the normal, what is the angle of refraction? (22.9°)

4.The refractive index of the lens of the human eye is 1.41. If a ray of light goes from the air into the lens at an angle of 55°, what is the angle of refraction? (35.5°)Part B

Part B

1.In an experiment, a block of cubic zirconia (n=2.16) is placed in water. A laser beam is passed from the water through the cubic zirconia. The angle of incidence is 50°, and the angle of refraction is 27°. What is the index of refraction of this cubic zirconia? (2.24)

2.A ray of light approaches a jar of honey at an angle of 30°. If the angle of refraction is 19.5°,what is the refractive index of honey? (1.50)

3.A block of amber is placed in water and a laser beam travels from the water through the amber. The angle of incidence is 35° while the angle of refraction is 24°. What is the index of refraction of amber? (1.88)

4.A red laser beam travels from flint glass into lemon oil. The angle of incidence is 40° and the angle of reflection is 44°. What is the refractive index of lemon oil? (1.49)