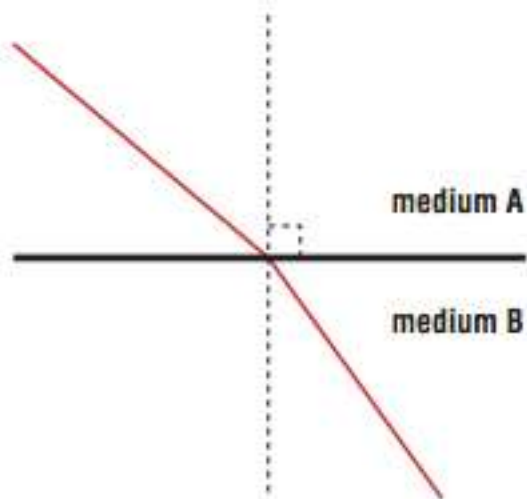


G10 Science: Class 11 Homework

1. The figure below represents a beam of light going from one medium into another.



- a) One medium is air (3.0×10^8 m/s) and the other is ice (2.29×10^8 m/s). Use this information to identify medium A and B. Explain. **[3 marks]**
- b) Do you know which direction the light beam is traveling? Does it matter? Explain. **[2 marks]**
2. The speed of light in vinegar is 2.30×10^8 m/s. Determine the index of refraction for vinegar. **[3 marks]**

3. The speed of light in sapphire is 1.69×10^8 m/s. Determine the index of refraction for sapphire. **[3 marks]**

4. The speed of light in an unknown substance is 2.20×10^8 m/s.

Medium	Index of refraction (n)
air/vacuum	1.00
ice	1.31
pure water	1.33
ethyl alcohol	1.36
quartz	1.46
vegetable oil	1.47
olive oil	1.48
acrylic	1.49
glass	1.52
zircon	1.92
diamond	2.42

- a) Calculate the index of refraction for this substance. **[3 marks]**

- b) Use the Index of Refraction Table to determine a possible identity of the unknown substance. **[1 mark]**

5. The critical angle for sapphire is 34.4° . For each angle of incidence, determine if it would result in total internal reflection in a sapphire by writing Yes/No. **[4 marks]**

a) 23.7° _____

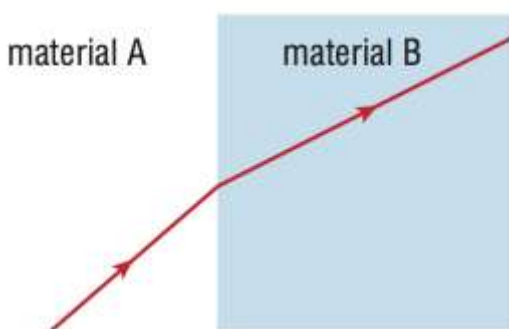
b) 34.7° _____

c) 53.4° _____

d) 31.5° _____

6. Suppose you calculated the speed of light in an unknown substance to be 4.00×10^8 m/s. How could you tell if you made an error in your calculations? **[2 marks]**

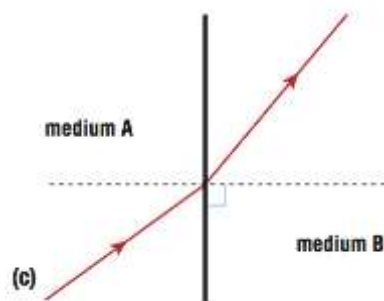
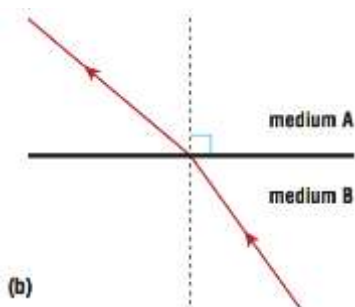
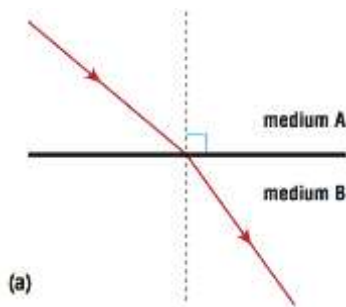
7. The figure below represents a beam of light traveling through two different media.



- a) Which medium has the greater index of refraction? How do you know? **[2 marks]**

- b) Which medium will light travel slower? How do you know? **[2 marks]**

8. The following figures show light traveling through two different media. In which diagrams would total internal reflection be possible if the angle of incidence were increased? Justify your answer. **[3 marks]**



9. Draw a ray diagram for the figures below to locate the image. Use SALT to describe the image.
[20 marks]

