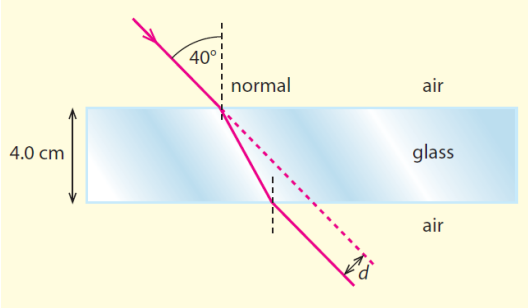
Physics Assignment 1_22nd June2020_IBDP y2_Topic 4.4

Q1. Red light of wavelength $6.8 \times 10^{-7}\ m$ in air enters glass with a refractive index of 1.583, with an angle of incidence of 38°. Calculate:
   a) the angle of refraction
   b) the speed of light in the glass
   c) the wavelength of light in the glass.

Q2. Light of frequency $6.0 \times 10^{14}\ Hz$ is emitted from point **A** and is directed toward point **B** a distance of 3.0 m away.
   a) Determine how long will it take light to get to **B**.
   b) Calculate how many waves fit in the space between **A** and **B**.

Q3. A ray of light is incident on a rectangular block of glass of refractive index 1.450 at an angle of 40°, as shown in the diagram. The thickness of the block is 4.00 cm. Calculate the amount *d* by which the ray is deviated.



Assignment No 2_IBDPy2_Physics_26th June2020

Q1. The speed of sound in air is 340 m/s and in water it is 1500 m/s. Determine the angle at which a beam of sound waves must hit the air– water boundary so that no sound is transmitted into the water.

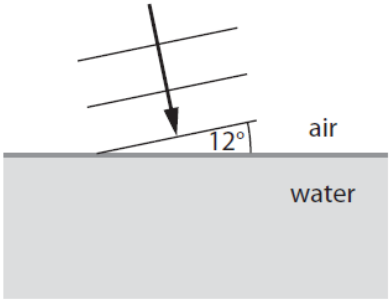
Q2. Planar waves of wavelength 1.0 cm approach an aperture whose opening is also 1.0 cm. Draw the wavefronts of this wave as they emerge through the aperture.

Q3. Repeat question **5** for waves of wavelength 1 mm approaching an aperture of size 20 cm.

Q4. A radio station, R, emits radio waves of wavelength 1600 m which reach a house, H, directly and after reflecting from a mountain, M, behind the house (see diagram). The reception at the house is very poor. Estimate the shortest possible distance between the house and the mountain. (Pay attention to phase changes.)

Assignment 3_Phy_IBy2_29th June 20_week2

1. A man is swimming underwater at a depth of 2.0 m. The man looks upwards.
   a) Explain why he can see the world outside the water only through a circle on the surface of the water.
   b) Calculate the radius of this circle given that the refractive index of water is 1.33.
   c) Discuss how the answer to **b** changes (if at all) if he looks up from a greater depth.
   d) Sound waves travelling in air approach an air–water boundary. The speed of sound in air is 340 m/s and in water it is 1500 m/s. The wavefronts make an angle of 12° with the boundary.



   (i) Calculate the angle the wavefronts in the water make with the boundary.
   (ii) Draw three wavefronts in the water.
   (iii) Use your answer to **ii** to suggest why a person swimming underwater near a noisy beach does not hear much noise.

Assignment 4_IBDP y2_Phy_3rd July_Friday

Q1. Describe what is meant by a standing wave. List the ways in which a standing wave differs from a travelling wave.
Q2. Outline how a standing wave is formed.
Q3. In the context of standing waves describe what is meant by:
a node
b antinode
c wave speed.