**Physics 30** – **Lesson 8**

## Refraction of Light

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**Practice problems**

1.



2.



3.

θ1 = 60o

air

plastic

θ2

water

θ2

θ3



4.



θ4

50o

θ3

θ1

θ2

θ’3

θ’2



5.

apparent position of fish

actual position of fish

6. At the critical incident angle the angle of refraction is 90o.



7. At the critical incident angle the angle of refraction is 90o.



8. The angle of refraction in water is 60o . If nplastic= 1.62 trace the ray path through the system below.

θ1 = 60o

water

θ2

plastic

θ2

θ3

air



**Assignment**



1)

/2



2)

/4









3)



/3

4)



/3

5)



/3

6)



/3

7)

















/4

8)



















/6

9)



















/6

10)



/8

11)



/8

12)

Water

n2 = 1.33

Air

n1 = 1.00

25o

i



/3

The water refracts the light from the penny so it can enter the eye

No water

Water

13)

/3

14) Hot air has a slightly different refraction index than cool air and therefore causes light to bend differently. The refraction is not uniform resulting in irregular bending of light.

/2

15)



/3

16)



/3

17)



/3

18)





/5

19)

20cm





r = ?

/8



The rays that are not refracted are totally internally reflected



20)



Calculate the sine of the angles:

|  |  |  |  |
| --- | --- | --- | --- |
| 1  checkmark | sin1 | 2 | sin2 |
| 0o  10o  20o  30o  checkmark  40o  50o  60o | 0.00  0.17  0.34  0.50  0.64  0.77  0.87 | 0o  6o  12o  18o  23o  28o  32o | 0.00  0.10  checkmark  0.21  0.31  checkmark  0.39  0.47  0.53 |

checkmark

checkmark

checkmark

checkmark

checkmark

checkmark

sin1

sin1 Vs sin2

1.00

0.75

0.50

0.25

0

0 0.25 0.50 0.75 1.00

sin2

•

•

•

•

•

•

•

0.76

0.46

/12



checkmark

checkmark