**Wave Phenomena Review Solutions**

1. (i.) 2tn = mλ t=225x10-9 m n=1.34 m=1(trying to find longest λ)

[2\*(225x10-9)\*1.34]/1 = λ

λ = 6.03x10-7 m = 603 nm

(ii.) Some wavelengths of light will experience destructive interference due to the reflected light while others may experience constructive interference. The result is you would see presence of some colors and absence of others.

1. Vs=28.0 m/s f=520 Hz f’=566 Hz

f’=f\*[c/(c-vs)]

566 = 520 (c/c-28)

(566/520) \* (c-28) = c

1.08846154c – 30.4769231 = c

.08846154c = 30.4769231

c = 345 m/s

1. (i.) Rayleigh criterion indicates that a just resolved image appears when the principal

 maxima of the diffracted image of star X aligns with the first minimum of the

diffracted image of star Y.

(ii.) θ = (1.22\*λ)/ b λ = 4.8x10-7 m b=5.0x10-2 m

 θ = (1.22\*4.8x10-7)/(5.0x10-2)

 θ = 1.1712x10-5

 θ = x/D D = 1.0x1018 m

 θ\*D = x (1.1712x10-5)\*(1.0x1018) = x

 x = 1.2x1013 m

1. (i.) f’ = f \* [c/(c+vs)] f=850 Hz c=330 m/s vs=6.5 m/s

f’ = 850 \* [330/(330+6.5)] f’ at minimum would have lower freq.

f’ = 830 Hz

 (ii.) Range would go from moving away to moving towards so need to calculate

f’ = f \* [c/(c-vs)]

f’ = 850 \* [330/(330-6.5)] f’=870 Hz

Range = 830 Hz – 870 Hz

1. 1. (i.) Coherent = in phase or no phase difference

(ii.) monochromatic = one wavelength or single frequency – don’t say one color

* 1. At point B, it is a dark fringe. Therefore you are dealing with destructive interference, so the phase difference for destructive interference is π.