

Section 1.2 - Light Waves

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1. a. $f = 5$ classes in 375 minutes

$$T = \frac{375 \text{ min}}{5 \text{ (classes)}} \left(\frac{60 \text{ s}}{1 \text{ min}} \right) = 4500 \text{ s}$$

$$\boxed{T = 4500 \text{ s}}$$

b. 10 oscillations in 6.7 seconds

$$T = \frac{6.7 \text{ s}}{10} = 0.67 \text{ s}$$

$$\boxed{T = 0.67 \text{ s}}$$

2. a. 120 oscillations in 2.0 seconds

$$f = \frac{120}{2.0 \text{ s}} = 60. \text{ Hz}$$

$$\boxed{f = 60 \text{ Hz}}$$

b. 1200 turns in 1 min.

$$f = \frac{1200}{1 \text{ min}} \left(\frac{1 \text{ min}}{60 \text{ s}} \right) = 20 \text{ Hz}$$

$$\boxed{f = 20 \text{ Hz}}$$

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3. a.

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$$f = \frac{5(\text{classes})}{375\text{min}} \left(\frac{1\text{min}}{60\text{s}} \right) = 2.2 \times 10^{-4} \text{ Hz}$$

$$\boxed{f = 2.2 \times 10^{-4} \text{ Hz}}$$

b.

$$f = \frac{10}{6.7\text{s}} = 1.5 \text{ Hz}$$

$$\boxed{f = 1.5 \text{ Hz}}$$

4. a. $T = \frac{2\text{s}}{120(\text{osci})} = 1.7 \times 10^{-2} \text{ s}$

$$\boxed{T = 1.7 \times 10^{-2} \text{ s}}$$

b. $T = \frac{1\text{min} (60\text{s})}{1200 (1\text{min})} = 0.05\text{s} = 5 \times 10^{-2} \text{ s}$

$$\boxed{T = 5 \times 10^{-2} \text{ s}}$$

5. a. lower frequencies - Infrared

b. upper frequencies - Ultraviolet

6. $r = 6400\text{km}; v = c = 3.00 \times 10^8 \text{ m/s}$

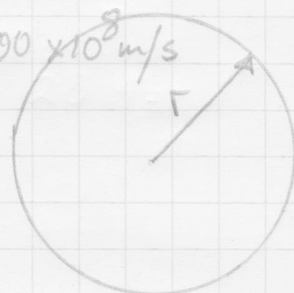
$$r = 6400\text{km} = 6.4 \times 10^3 \text{ km} = 6.4 \times 10^6 \text{ m}$$

circumference, $d = 2\pi r = 2\pi (6.4 \times 10^6 \text{ m})$

$$v = \frac{d}{t}$$

$$t = \frac{d}{v} = \frac{2\pi(6.4 \times 10^6 \text{ m})}{3.00 \times 10^8 \text{ m/s}} = 0.13 \text{ s}$$

$$\boxed{t = 0.13 \text{ s}}$$



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7. $d = 150 \times 10^6 \text{ km} \left(\frac{1000 \text{ m}}{1 \text{ km}} \right) = 1.5 \times 10^{11} \text{ m}$

$$v = c = 3.00 \times 10^8 \text{ m/s}$$

$$t = \frac{d}{v} = \frac{1.5 \times 10^{11} \text{ m}}{3.00 \times 10^8 \text{ m/s}} = 500 \text{ s}$$

$$\boxed{t = 500 \text{ s}} \quad (= 8 \text{ min } 20 \text{ s})$$

8. $f = 95.1 \text{ MHz} = 95.1 \times 10^6 \text{ Hz}$ Radio Canada

$$v = c = 3.00 \times 10^8 \text{ m/s}$$

$$v = \lambda f \quad \lambda = \frac{v}{f} = \frac{3.00 \times 10^8 \text{ m/s}}{95.1 \times 10^6 \text{ s}^{-1}}$$

$$\boxed{\lambda = 3.15 \text{ m}}$$

9. a. Umbra - region C
Penumbra - B & D

b. The umbra would increase in size & the penumbra would shrink to zero area.

10.

White, - white clothing absorbs less light & therefore does not convert as much light to heat.