

Assignment 1 Solutions

1. Trip time = $\frac{\text{distance to nearest star}}{\text{space ship speed}}$

$$= \frac{4 \times 10^{16} \text{ m}}{10^4 \text{ m/sec}}$$

$$= 4 \times 10^{12} \text{ sec.}$$

$$= 4 \times 10^{12} \text{ sec} \times \frac{1 \text{ yr.}}{365 \frac{\text{days}}{\text{yr.}} \times 24 \frac{\text{hr}}{\text{day}} \times 3600 \frac{\text{sec}}{\text{day}}}$$

$$= 1.27 \times 10^5 \text{ years.}$$

2. Time for light to travel from sun to Earth is

$$= \frac{\text{Earth Sun distance}}{\text{speed of light}}$$

$$= \frac{1.5 \times 10^{11} \text{ m}}{3 \times 10^8 \text{ m/sec}}$$

$$= 500 \text{ sec}$$

$$= 8.3 \text{ minutes}$$

3. # atoms in body = $\frac{\text{volume of body}}{\text{volume of atom}}$

$$\approx \frac{2 \text{ m} \times 0.5 \text{ m} \times 0.1 \text{ m}}{(10^{-10} \text{ m})^3}$$
$$= 10^{29}$$

4.

Time Interval	Distance Travelled
$0 \rightarrow 0.5$ hr.	$3 \frac{\text{km}}{\text{hr}} \times 0.5 \text{ hr} = 1.5 \text{ km}$
$0.5 \rightarrow 1.25$	$30 \frac{\text{km}}{\text{hr}} \times 0.75 \text{ hr} = 22.5$
$1.25 \rightarrow 1.5$	$6 \frac{\text{km}}{\text{hr}} \times 0.25 \text{ hr} = 1.5$
$1.5 \rightarrow 2.0$	$24 \frac{\text{km}}{\text{hr}} \times 0.5 \text{ hr} = 12$

Total distance travelled in 2 hrs is $1.5 + 22.5 + 1.5 + 12 = 37.5 \text{ km}$

$$\text{Average Speed} = \frac{37.5 \text{ km}}{2 \text{ hrs}} = 18.75 \text{ km/hr.}$$



5.

Time	Speed $v = at$		$x = \frac{1}{2} at^2$
	m/sec	km/hr.	
0 sec	0	0	0 m
1	2	7.2	1
2	4	14.4	4
3	6	21.6	9
4	8	28.8	16
5	10	36	25

