

Sept 11 Pp1

1. a. 15 m per second
 $m_{\text{bar}} = 30 \text{ kg}$
 $F_2 = \text{weight}$
 $F_1 = \text{tension}$

b. $\frac{15 \text{ m}}{1 \text{ min}} = \frac{15 \text{ m}}{60 \text{ s}} = 0.25 \text{ m/s}$

c. $\uparrow \text{ forces} > \downarrow \text{ forces} \therefore F_1 > F_2$

d. $F_1 = F_2$

e. $F = ma = 30 \times 2.5 = 75 \text{ N}$

f. $RF = 75 \text{ N} \quad \therefore F_1 - F_2 = 75$
 $F_2 = W = 300 \text{ N} \quad F_1 = 75 + 300 = 375 \text{ N}$

2. a. force of gravity

aii. greatest mass, \therefore greatest force of gravity

aiii. distance

aiii. it has a very strong gravitational force (and its distance does not allow its mass to orbit anything else.)

av. Uranus + Neptune

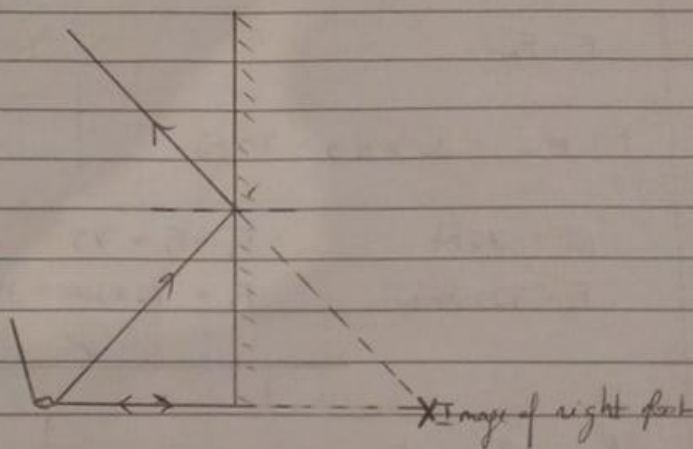
a. i. they are very dim.

b. i. because they are closer to the heavenly bodies + also little or no light pollution.

ii. radio waves.

iii. because up there electricity from a power station is impossible

3a + b.



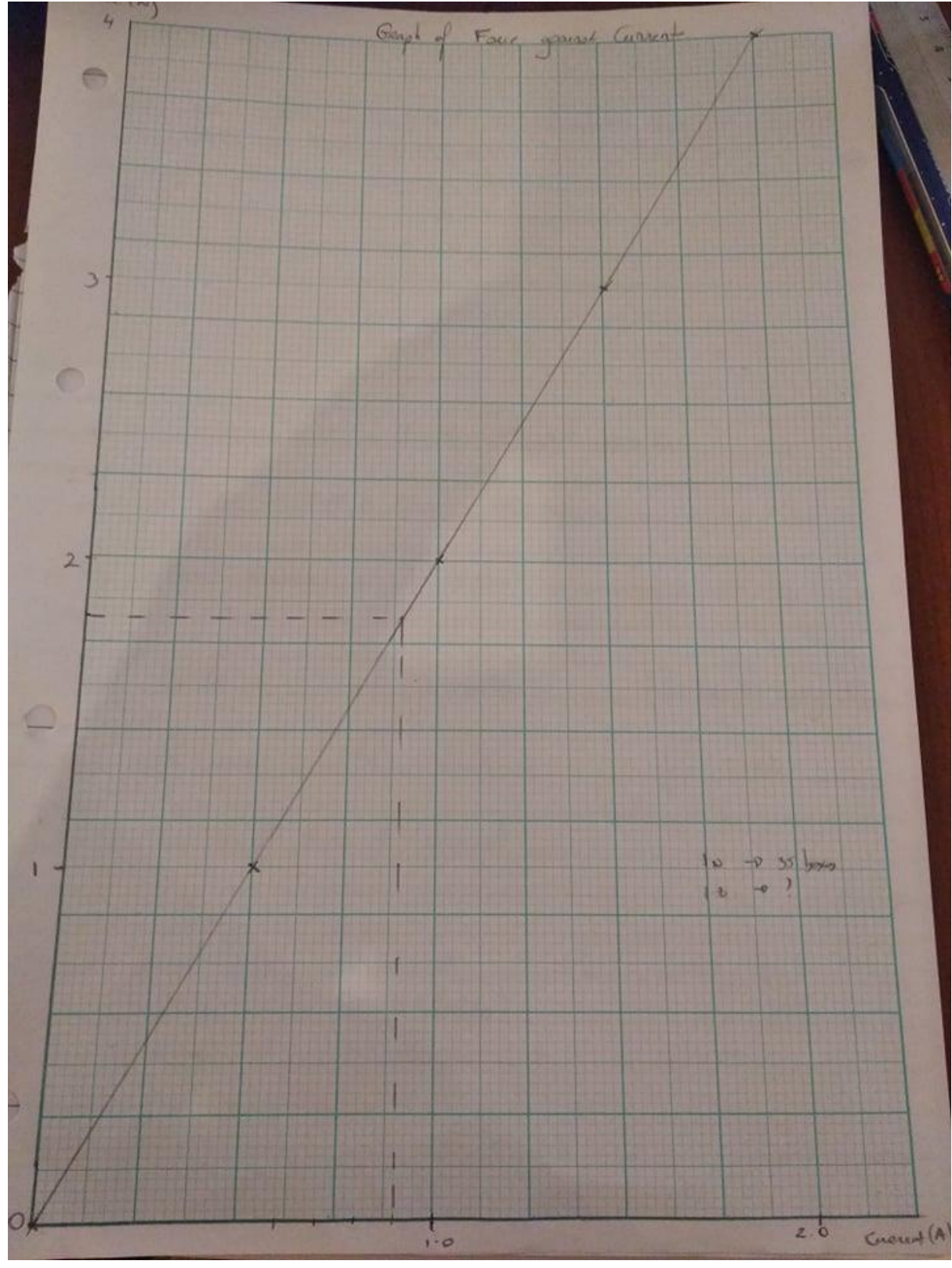
c. laterally inverted

(e) d

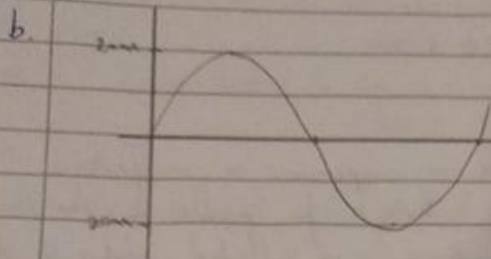
d. same size, virtual

(ii) The reflected ray is out of the way.
since $\hat{i} = \hat{r}$, and \hat{i} is not within \hat{r} .

Graph of Force versus Current



4-a. each particle will move / vibrate up and down, at right angles to direction of travel of the wave.



c. i. $T = 4 \times 10^{-4} \text{ s}$ $F = \frac{1}{T} = \frac{1}{4 \times 10^{-4}} = 2500 \text{ Hz}$

ii. $v = f\lambda = 2500 \times 0.6 = 1500 \text{ m/s}$

d. speed decreases + λ decreases

(5a) rheostat. / ii) ammeter (b) Newton Spring Balance.

(c) graph paper (d) directly \propto (e) 1.9A.

(f) increase no. of turns of solenoid

6a. $u = 0$

$$a = 10 \text{ m/s}^2$$

$$t = 4 \text{ s}$$

$$v = ?$$

$$s = ?$$

$$v = u + at$$

$$v = 0 + (10)(4)$$

$$v = 40 \text{ m/s}$$

b. $s = ut + \frac{1}{2}at^2$

$$s = 0 + \frac{1}{2}(10)(4^2)$$

$$s = 80 \text{ m}$$

6c.

$$\text{speed} = \frac{s}{t}$$

$$320 = \frac{80 \times 2}{t}$$

$$t = \frac{80 \times 2}{320} = 0.5 \text{ sec}$$

6d. as a longitudinal wave as compressions & rarefactions
 i. air particles vibrate back & forth, parallel to the direction
 of travel, but the bottom & are reflected back to the top.

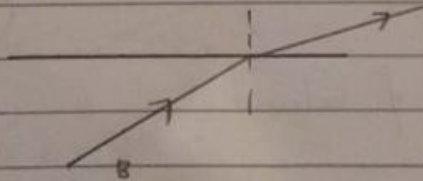
6e.i sound waves with a frequency greater than 20,000 Hz.

6e.ii can pass through water & is reflected by stone.

7.a. normal incidence

b. Refracted due to a change in speed

c.



d(i.) light wave travelling from a denser to a less dense medium.
 or \hat{i} greater than \hat{e} .

(ii.) $\angle x$ = angle of incidence
 $\angle y$ = angle of reflection.

(iii.) $\angle x = \angle y$

7e.

$$\eta = \frac{\text{real depth}}{\text{app depth}} = \frac{120}{0.90} = 1.33$$

8. a.

$$\text{acceleration} = \frac{\Delta y}{\Delta x} = \frac{20-0}{1-0} = 20 \text{ m/s}^2$$

b.

constant speed = last part of parveq
 $t = 0.5 \text{ mins} \times 60 = 30 \text{ sec.}$

ci.

between the 1st and 2.5th min (steepest)

ii.

$$A = \text{distance} = \left(\frac{\text{sum of parallel sides}}{2} \right) h = \left(\frac{20 + 120}{2} \right) (1.5 \times 60)$$
$$= \left(\frac{140}{2} \right) (90)$$
$$= 6300 \text{ m}$$

di.

$$t = 3 \text{ min} = 3 \times 60 = 180 \text{ sec}$$

$$v = 0$$

$$d = 1 \text{ m/s}^2 \therefore a = -1 \text{ m/s}^2$$

$$u = 120 \text{ m/s}$$

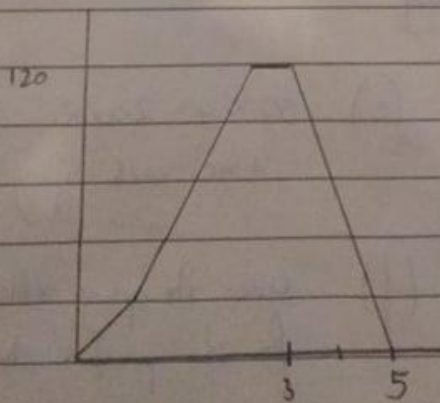
$$t = ?$$

$$a = \frac{v - u}{t}$$

$$-1 = \frac{0 - 120}{t}$$

$$t = \frac{-120}{-1} = 120 \text{ s}$$

dii



9 a.



(b) Light Dependent Resistor

c. switching circuit.

d. because little/small changes in light need to be observed.

e. gets darker, I is 0mA , \therefore Resistance increases. since $I \propto \frac{1}{R}$

f.i. in dark, R is big and when switch is closed, the current chooses to pass through switch rather than through LDR.
 \therefore current is read from ammeter.

f.ii. $5\text{mA} = 5 \times 10^{-3}\text{A} = 0.005\text{A}$.

$$V = IR \quad R_f = \frac{1.5}{0.005} = 300\Omega$$

$$1.5 = 0.005 R_f$$

(since current will not pass through LDR,
Hence $R_f = 300\Omega = R_{\text{fixed}}$)

10a. move up towards the 65, 70, 75 N.

b. 100N , $W = mg$, $\therefore 10\text{kg}$.

(c) 50N each

(e) $50 \times 4 = 200\text{N}$.

since each spring takes 50N .

(d.) mountains 0
Jupiter greater
Mercury less.

(f) once the spring settles it is difficult for the pointer to move.