Exercise 3B

(1) $F = mg$ weight $= mg = 4 \times 9.8 = 39.2\ N$

(2) weight $= 4900 = mg$

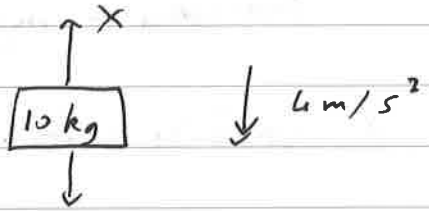
$= m \times 9.8$

So $m = 4900 \div 9.8$

$= 500kg$

(3) weight $= mg = 0.1 \times 9.8 = 0.98\ N$

(4) (a)



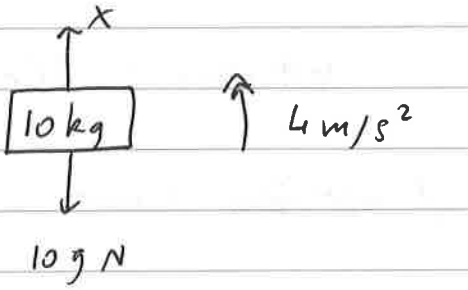
$\therefore$ Net Force $= 10g - X$

& Net Force $= ma$

$\therefore \quad 10g - X = 10 \times 4$

$\Rightarrow \quad X = 58N$

(b)



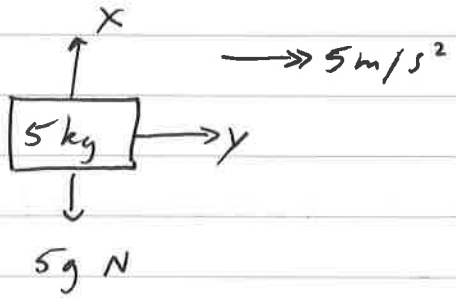
$\therefore$ Net Force $= X - 10g$

& Net Force $= ma$

$\therefore \quad X - 10g = 10 \times 4$

$\Rightarrow \quad X = 138\ N$

(c)



Vertically

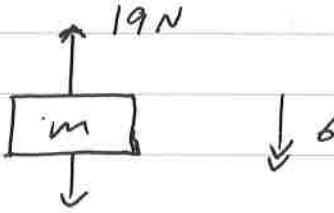
$X = 5g\ N$

Horizontally

$F = ma \Rightarrow F = 5 \times 5\ N$

$= 25N$

(d)



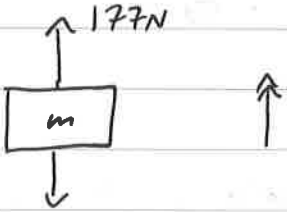
: Net Force $= mg - 19$

& Net Force $= ma$

$\therefore\ mg - 19 = m * 6$

So $m(g-6) = 19 \Rightarrow m = 5kg$

(e)



: Net Force $= 177 - mg$

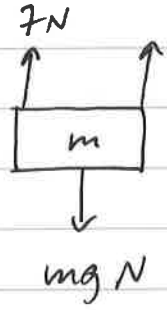
& Net Force $= ma$

$\therefore\ 177 - mg = 2m$

So $m(2+g) = 177$

$\Rightarrow m = 15kg$

(f)



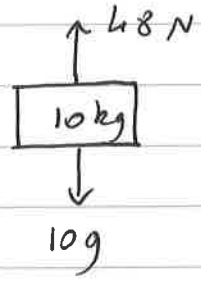
$\downarrow 0.8\,m/s^2$: Net Force $= mg - (7+20)$

& Net Force $= ma$

$\therefore \quad mg - 27 = 0.8m$

So $\quad m(g - 0.8) = 27 \Rightarrow \quad m = 3\,kg$

(g)



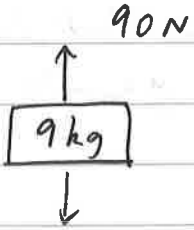
$\downarrow a\,m/s^2$: Net Force $= 10g - 48$

& Net Force $= ma$

$\therefore \quad 10g - 48 = 10a$

$\Rightarrow \quad a = 5\,m/s^2$

(h)



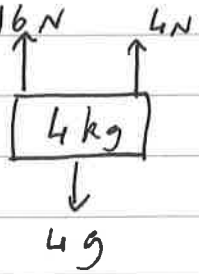
$\uparrow a\,m/s^2$: Net Force $= 90 - 9g$

& Net Force $= ma$

$\therefore \quad 90 - 9g = 9a$

$\Rightarrow \quad a = 0.2\,m/s^2$

(i)

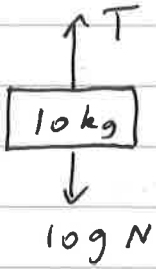


$\downarrow a\,m/s^2$: Net Force $= 4g - (16+4)$

& Net Force $= ma$

$\therefore \quad 4g - 20 = 4a \quad \Rightarrow a = 4.8\ m/s^2$

(5)



(a) $\uparrow a = 5\ m/s^2$

Net Force $= ma$

So $T - 10g = 10 \times 5$

$\Rightarrow \quad T = 148\ N$

(b) $\downarrow a = 5\ m/s^2$: Net Force $= ma$

So $10g - T = 10 \times 5$

$\Rightarrow \quad T = 48\ N$

(c) and (d) : Since velocity is constant The only Force T is The force carrying The weight of the object, & The only accel is That due to gravity.

So $T = 10g = 98\ N$

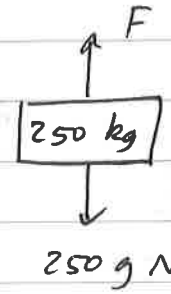
(7)

$\uparrow \frac{1}{2}\ m/s^2$: Net force $= ma$

So $T - 50g = 0.5 \times 50$

$\Rightarrow \quad T = 515\ N$

(9)



a m/s² ; Also $u = 0$, $t = 10$s
$s = 25$m

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

$\Rightarrow 25 = 0 + \frac{1}{2} \cdot 100 \cdot a$

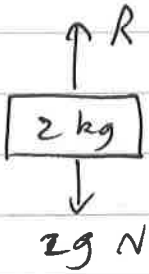
$\therefore a = 0.5$ m/s²

Now Net Force = ma

$\therefore F - 250g = 0.5 \times 250$

$\Rightarrow F = 2575$ N

(11)



a m/s² ; Also $u = 0$, $s = 16.6$m
$t = 2$s

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

$\therefore 16.6 = 0 + 2a$

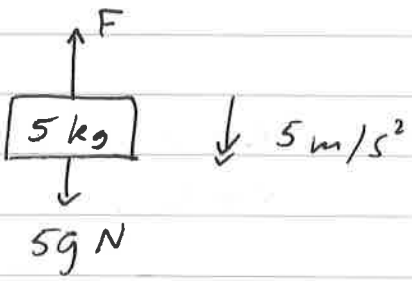
$\Rightarrow a = 8.3$ m/s²

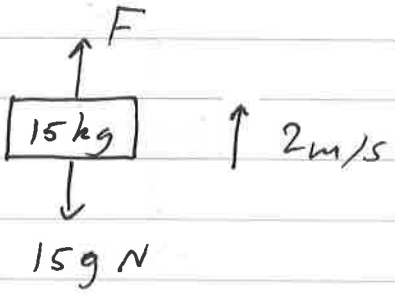
Now, Net Force = ma

$\therefore (2g - R) = 2 \times 8.3 \Rightarrow R = 3$ N

(13)

(13)





(a) Net Force = ma

$\therefore \quad 5g - F = 5 \times 5$

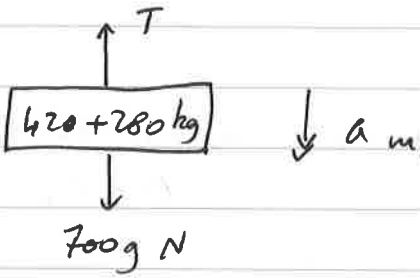
$\Rightarrow \quad F = 24\,N$

(b) Since velocity is constant $a = 0$, so Force is only due to weight of bucket

$F = mg \Rightarrow F = 15g\,N$

$= 147\,N$

(12)



; Also $u = 0,\ t = 10s$

$S = 75m$

So $S = ut + \frac{1}{2}at^2$

$\Rightarrow \quad 75 = 0 + 50a$

$\therefore \quad a = 1.5\,m/s^2$

Then, Net Force = ma

$\therefore \quad 700g - T = 700 \times 1.5 \quad \Rightarrow \quad T = 5810\,N$