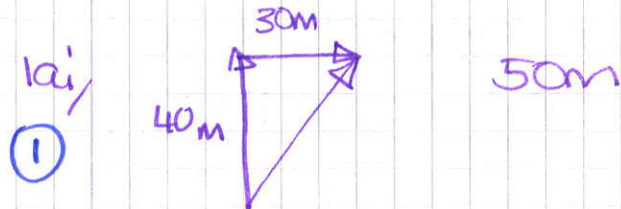


# Practise NAB. - Unit I



ii)  $\tan \theta = \frac{30}{40} = 0.75$

①  $\theta = 37^\circ$  (037)  
direction =  $37^\circ$  East of North.

② b)  $\bar{v} = \frac{s}{t} = \frac{50}{20} = 2.5 \text{ ms}^{-1}$



vertical  $\sin 25 = \frac{V_v}{20}$

$V_v = 20 \times \sin 25$   
 $= \underline{\underline{8.5 \text{ ms}^{-1}}}$

ii)  
①

horizontal  $\cos 25 = \frac{V_h}{20}$

$V_h = 20 \times \cos 25$   
 $= \underline{\underline{18 \text{ ms}^{-1}}}$

b) ii)  $s =$   
 $u = 8.5$   
 $v = 0$   
 $a = -9.8 \text{ ms}^{-2}$   
 $t = ?$

②

$$v^2 = u^2 + 2as$$

$$0 = 8.5^2 + 2 \times (-9.8) \times s$$

$$0 = 72.25 - 19.6 \times s$$

$$s = \frac{72.25}{19.6} = 3.7 \text{ m}$$

3a)  $w = mg$

①  $= 0.5 \times 9.8$   
 $= 4.9 \text{ N}$

b)  $F = ma$

②  $(45 - 4.9) = 0.5 \times a$   
 $40.1 = 0.5a$

$$a = \frac{40.1}{0.5} = 80 \text{ ms}^{-2}$$

3c, acceleration increases as fuel is burned,

- ② leaving less mass for the engine force to act upon, creating a greater acceleration.

4a, momentum before =  $m_1 v_1$   
 $= 4 \times 5$   
 $= 20 \text{ kgms}^{-1} = \text{momentum after.}$

② trolley 1 after =  $m_2 v_2$   
 $= 4 \times 2$   
 $= 8 \text{ kgms}^{-1}$

trolley 2 after =  $20 - 8$   
 $= 12 \text{ kgms}^{-1}$

$m_3 v_3 = 12$   
 $v_3 = 12/2 = 6 \text{ ms}^{-1}$

① b, change in momentum =  $12 \text{ kgms}^{-1}$

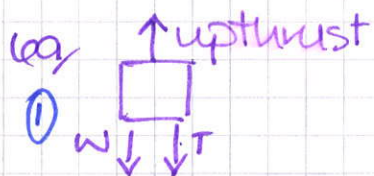
ii,  $ft = \text{change in momentum}$

②  $F \times 0.4 = 12$   
 $F = \frac{12}{0.4} = 30 \text{ N}$

5a,  $\rho = \frac{m}{V}$   
 $\Rightarrow 1150 = \frac{m}{2.4 \times 10^{-4}}$

②  $m = 0.276 \text{ kg.}$

② b, When a liquid is converted to a gas the spacing between the atoms (or molecules) increases by a factor of 10. In each of the 3 dimensions means total volume increases by  $10 \times 10 \times 10 = 1000$ .



b, upthrust - pressure varies with depth.  
② greater pressure at bottom,  $\therefore$  greater force, unbalanced force = upthrust

7a,  $\frac{V_1}{T_1} = k \Rightarrow \frac{21.5}{293} = 0.073$   $\frac{22.9}{313} = 0.073$   $\frac{24.4}{333} = 0.073$   $\frac{25.9}{353} = 0.073$   $\frac{27.3}{373} = 0.073$

① b, Stir to even heat distribution.