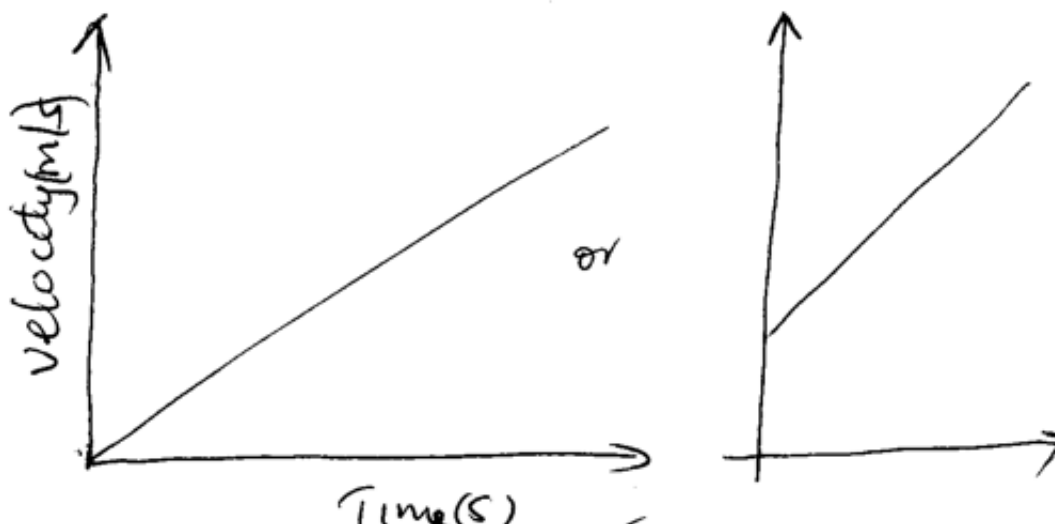


**Answer all questions in the spaces provided**

1. -Increasing temperature. ✓ (1mark)  
-Enlarge surface area of exposure. ✓ (1mark) .

2.



Acceleration (1 mark)

Correct graph (constant acceleration) (1mark)

3. A needle float because of the surface tension at the surface/surface tension broken for the needle to sink. ✓(1mark)
4. Distance = Area under curve ✓  

$$= \frac{1}{2} \times 4 \times 2 + \frac{1}{2} \times 4 \times 2 \quad \checkmark \text{ (1mark)}$$

$$= 8M \quad \checkmark \text{ (1mark)}$$
5. Fixed mass of ages, or a given mass or mass constant
6. Sum of clockwise moment = sum of anticlockwise moments

$$\begin{aligned}
 15 \times 0.05 &= F \times 0.1 \\
 F &= \frac{15 \times 0.05}{0.1} \\
 &= \frac{0.75}{0.1} \quad \checkmark \text{ (1mark)} \\
 &= 7.5N
 \end{aligned}$$

Force between the magnets =  $7.5 - 3 = 4.5$  (Attractive) (1mark)

7. Air above the plane move faster than air below creating a region of low pressure above
8. Stops rising when up thrust equal to the weight. ✓ Or Upward forces equal to downward force. (1mark)
- 9.

$$P = FV \checkmark \quad (1\text{mark})$$

$$= 300 \times \frac{2}{3} \checkmark \quad (1\text{mark})$$

$$= 100W \checkmark \quad (1\text{mark})$$

10. . Net force zero  $\checkmark$  or Resultant force zero

11.

$$d = \frac{v}{f} \checkmark = \frac{9.0 \times 10^{-16}}{5.0 \times 10^{-13}} \checkmark$$

$$= 1.8 \times 10^{-3} \text{ cm } \checkmark$$

12. For a real gas there is no force of attraction between molecules.  $\checkmark$  (1mark)

13. .  $P = h\rho g \checkmark (1\text{mark})$

$$103000 = h \times 1030 \times 10 \checkmark (1\text{mark})$$

$$h = \frac{103000}{1030 \times 10} = 10m \checkmark (1\text{mark})$$

**Answer all questions in the spaces provided**

14. (a)  $\left. \begin{array}{l} \text{Correct range} = (100 - 0)^\circ \text{C} = 100^\circ \text{C} \\ \text{Faulty range} = (90 - 10^\circ \text{C}) = 80^\circ \text{C} \end{array} \right\} \checkmark (1\text{mark})$

$$\text{New range} = \frac{80}{100} \times 20 = 16^\circ \text{C} \quad (1\text{mark})$$

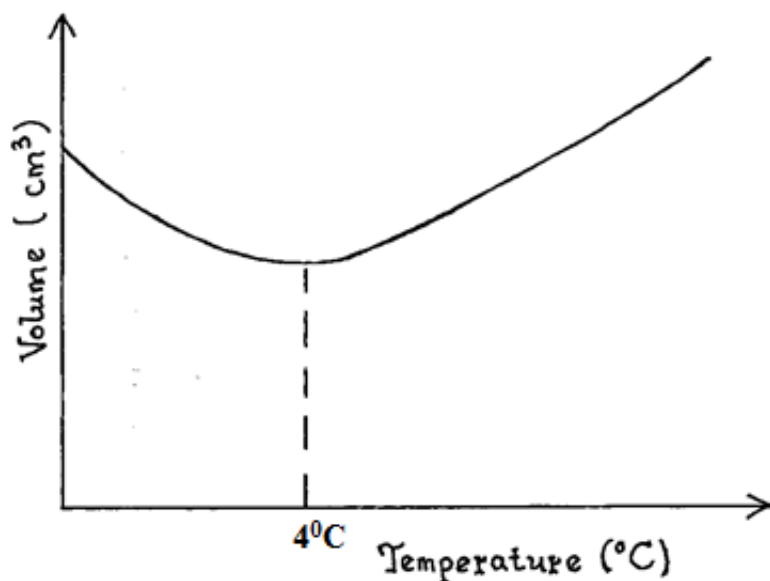
$$\text{Thermometer reading} = 16 + 10 = 26^\circ \text{C} \checkmark (1\text{mark})$$

(b) (i) For quick action /conduction of heat)  $\checkmark$  (1mark)

(ii) Makes the thermometer sensitive.  $\checkmark$  (1mark)

(c) -Expand regularly.  $\checkmark$  (1mark) -Have wider temperature range.  $\checkmark$  (1mark)

(d)



Marking points 4°C (1 mark)

Shape of curve (1 mark)

(e) Ice-berg have density close to that of water hence it is partially submerged and cannot be seen.

15. (a) Is the heat used to change liquid to gaseous state without change in temperature

(b) (i) Mass of condensed steam  $M_s$

$$= 160 - 140 = 20 \text{ g} \quad 1 \text{ mark}$$

(ii)  $H = m_c C_c D \theta$  } 1 mark

$$= 0.06 \times 390 \times 20$$

$$= 468 \text{ J} \quad 1 \text{ mark}$$

(iii)  $Q = m_w C_w \Delta \theta$

$$= 0.08 \times 4200 \times 20$$

$$= 6720 \text{ J}$$

(iv) Heat lost = Heat gained

$$m_s L_v + m_s C_w D \theta = 6720 + 468$$

$$0.02 \times L_v + 0.02 \times 4200 \times 65 = 6720 + 468$$

$$L_v = \frac{7188 - 5460}{0.02}$$

$$L_v = \frac{1728}{0.02} = 86400 \text{ J kg}^{-1}$$

(c) (i) Boiling temperature rises. (1 mark)

(ii) Clipping the rubber tube makes steam to accumulate increasing pressure inside the flask.

(1mark)

Increased pressure makes it difficult for the water molecule to escape into vapour, hence more energy is required. ✓ (1mark)

16. (a) 6N.

(b) (i) Resultant force =  $10 - 6$  ✓ (1mark) =  $4\text{N}$  ✓ (1mark)

$$\begin{aligned} \text{(ii)} \quad & \left. \begin{aligned} F &= Ma \\ 4 &= 2 \times a \end{aligned} \right\} \text{(1mark)} \\ & a = \frac{4}{2} \quad \checkmark \quad \text{(1mark)} \\ & \quad = 2\text{m/s}^2 \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad & v = u + at \quad \checkmark \\ & v = 0 + 2 \times 10 = \underline{20\text{m/s}} \quad \checkmark \quad \text{(1mark)} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & \text{Momentum is conserved.} \quad \checkmark \quad \text{(1mark)} \\ & 0 = 0.01 \times 400 + 4 \times V \quad \checkmark \\ & 4V = -4 \quad \checkmark \checkmark \quad \text{(2marks)} \\ & V = -1\text{m/s} \end{aligned}$$

17. (a) (i) 1.2 sec ✓✓ (2marks)

(ii) h = Area under curve ✓

$$\begin{aligned} & = \frac{1}{2} \times 8 \times 1.2 \quad \checkmark \quad \text{(1mark)} \\ & = 4.8\text{m} \quad \checkmark \quad \text{(1mark)} \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad & \text{Deceleration} = \text{Slope of the graph} \\ & = \frac{0 - 8}{1.6 - 1.2} \quad \checkmark \quad \text{(1mark)} \\ & = \frac{-8}{0.4} \quad \checkmark \quad \text{(1mark)} \\ & = -20\text{ms}^{-1} \end{aligned}$$

$$\begin{aligned} \text{(iv)} \quad & \left. \begin{aligned} F &= ma \\ F &= 70 \times -20 \end{aligned} \right\} \text{1 mark} \\ & = \underline{-1400\text{N}} \end{aligned}$$

Retarding force = 1400N

$$\begin{aligned} \text{(v)} \quad & \text{Depth} = \frac{1}{2} \times 0.4 \times 8 \quad \checkmark \quad \text{(1mark)} \\ & = 1.6\text{m} \quad \checkmark \quad \text{(1mark)} \end{aligned}$$

18. (a) Extrapolation ✓ (correct) (1mark) Absolute temperature -273 to 280 ✓ (1mark)

(b) (i) Atmospheric pressure/76 cmHg/760 mmHg ✓ (1mark)

(ii)  $24 + 76 = 100$  cmHg or 1000 mmHg ✓ (1mark)

(iii)  $PV = \text{Constant}$ . ✓ (1mark)

$$76 \times 15 = (70 + 24) \times l$$

$$l = 76 \times \frac{15}{100} = 11.4 \text{ cm} \quad \checkmark \quad (1\text{mark})$$

(c) (i) To expel air/remove air/push air out/drive air out. ✓ (1mark)

(ii) Pressure of air outside the bottle is greater than the pressure of air inside. ✓ (1mark)

(iii) Cooling cause condensation (1mark) of vapour, creating a partial ✓ (1mark)

vacuum/fewer vapour /Lowering pressure inside the bottle.