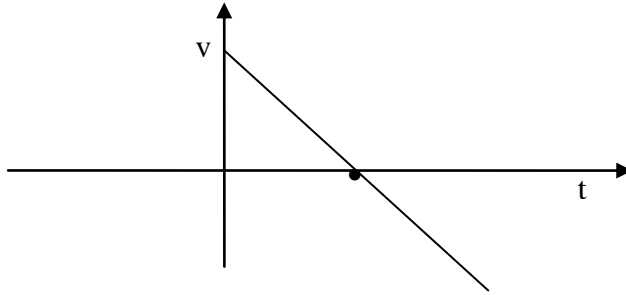


232/1 PHYSICS (2018)
KCSE Trial Exam

MARKING SCHEME

Q1. $3.48 - 0.02 = 3.46$

Q2.



3. Weight of hydrometer = weight of fluid displaced
 $= 90 \times 10^{-6} \times 800 \times 10$
 $= 0.72\text{N}$

Density of other liquid $= 1.2 \times 1000 = 1200\text{Kg m}^{-3}$

Weight displaced $= 0.72\text{N}$

Volume displaced $= m/\rho$
 $= 0.72/1200$
 $= 0.0006\text{ m}^3 \text{ or } 60\text{ cm}^3$

4. A --- C.O.G. is lower than that in B.

5. Vol. $= \pi r^2 h$
 $= 2.0 \times 10^{12} \times 5.0 \times 10^{-7}$
 $= 1.0 \times 10^6\text{ cm}^3$

6. It has a high density.

7. Surface tension of water supports the pin. Soap solution lowers the surface tension hence the pin sinks

8. $T = F_c$
 $= \frac{mv^2}{r}$
 $= \frac{2 \times 5^2}{2} = 25\text{ N}$

9. V.R $= 4$

10. Eff. $= \frac{M.A}{V.R} \times 100\%$
 $80\% = \frac{M.A}{4} \times 100$
 $M.A = 3.2$
 $\frac{500}{E} = 3.2$
Effort $= \frac{500}{3.2} = 156.25\text{N}$

$$11. \quad A_1 V_1 = A_2 V_2$$

$$\pi r^2 V_1 = \pi R^2 V_2$$

$$r^2 = \frac{1^2 \times 4.5}{1.5^2}$$

$$r = 1.414$$

$$12. (a) \quad P.E = mgh$$

$$= (120 + 2 \times 40) \times 10 \times 5$$

$$= 10,000J$$

(b) Energy is conserved

$$\frac{1}{2} \times 200 \times v^2 = 10,000$$

$$u^2 = \frac{10,000 \times 2}{200}$$

$$v = 10m/s$$

(c) Mass of N = 140 + (3x60) = 320Kg

Momentum before collision = momentum after collision

$$m_1 u_1 + m_2 u_2 = (m_1 + m_2) v$$

$$(2000 \times 10) + (320 \times 0) = (200 + 320) V$$

$$2000 = 520V \quad V = 3.85m/s$$

(d) Impulse = mv - mu

$$= 200 \times 3.85 - 200 \times 10$$

$$= 200(3.85 - 10) = -1230Kgm/s$$

Impulse = 1230Kgm/s

13. (a) The volume of a fixed mass of a gas is inversely proportional to the pressure provided the temperature remains constant.

(b) (i) Temperature Pressure.

(ii) Gradient = $\frac{40 - 0}{(5 - 0) \times 10^3}$

$$= \frac{40}{5} \times 10^{-3}$$

$$= 0.8 \times 10^{-3} = 8 \times 10^{-2}$$

K = $\frac{1}{\text{Gradient}}$

$$= \frac{1}{8 \times 10^{-2}} = 0.125 \times 10^{-2} = 1.25 \times 10^1$$

C = y intercept x K

$$= -16 \times (1.25 \times 10^1) = -200$$

(c) $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$

$$\frac{1 \times 10^5}{283} = \frac{P_2}{373}$$

$$P_2 = 1.32 \times 10^5$$

14. a) Its Amount of heat required to convert a unit mass of a substance from solid state to liquid state without change in temperature.

$$\begin{aligned} \text{b) (i) } Q &= ml_f \\ &= \frac{40}{1000} \times 334000 \\ &= 13360 \end{aligned}$$

$$\begin{aligned} \text{(ii) } Q &= ml_f + mc\Delta\theta \\ &= 13360 + 0.04 \times 4200 (T - 0) \\ &= 13360 + 1680T \end{aligned}$$

$$\begin{aligned} \text{iii) } Q &= M_w C \Delta\theta \\ &= 0.4 \times 4200 (160 - T) \\ &= 1680 (60 - T). \end{aligned}$$

$$\begin{aligned} \text{iv) } Q &= m_c c_c (60 - T) \\ &= 0.16 \times 400 (60 - T) \\ &= 64 (60 - T) \end{aligned}$$

$$\begin{aligned} \text{(v) } 1360 + 168T &= 1680(60 - T) \\ T &= 47.741 \text{ S} \end{aligned}$$

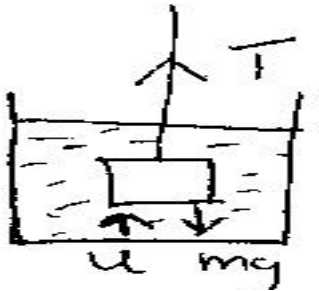
c) Due to weights the wire exerts pressure on the ice beneath it and therefore makes it melt at a temperature lower than its melting point, once the ice has melted the water formed flows over the wire and immediately solidifies since it is no longer under pressure. As it solidifies, the latent heat of fusion is given out, conducted by copper wire and melts the ice below it.

15. a) A floating body displaces its own weight of the liquid in which it floats

b) Weight of wood = weight of displaced water.

$$\begin{aligned} \rho_{\text{wood}} \times V_{\text{wood}} \times g &= \rho_{\text{water}} \times \frac{3}{5} V_{\text{wood}} \times g \\ \rho_{\text{wood}} &= 200 \times \frac{3}{5} = 600 \text{ kg/m}^3 \end{aligned}$$

c) i)



Tension in the string

Mg – weight of the body

u – upthrust

N/B the forces should touch the body.

ii) upthrust = weight of water displaced

$$= \frac{500}{1000} \times 10 \times 1000 = 5\text{N}$$

Resultant downward force = $mg - u = 3 \times 10^{-5}$
 $= 25\text{N}$

Clockwise moments = Anticlockwise moments

$$50xy = 25 \times 40$$

$$y = \frac{25 \times 40}{50} = 20\text{cm}$$

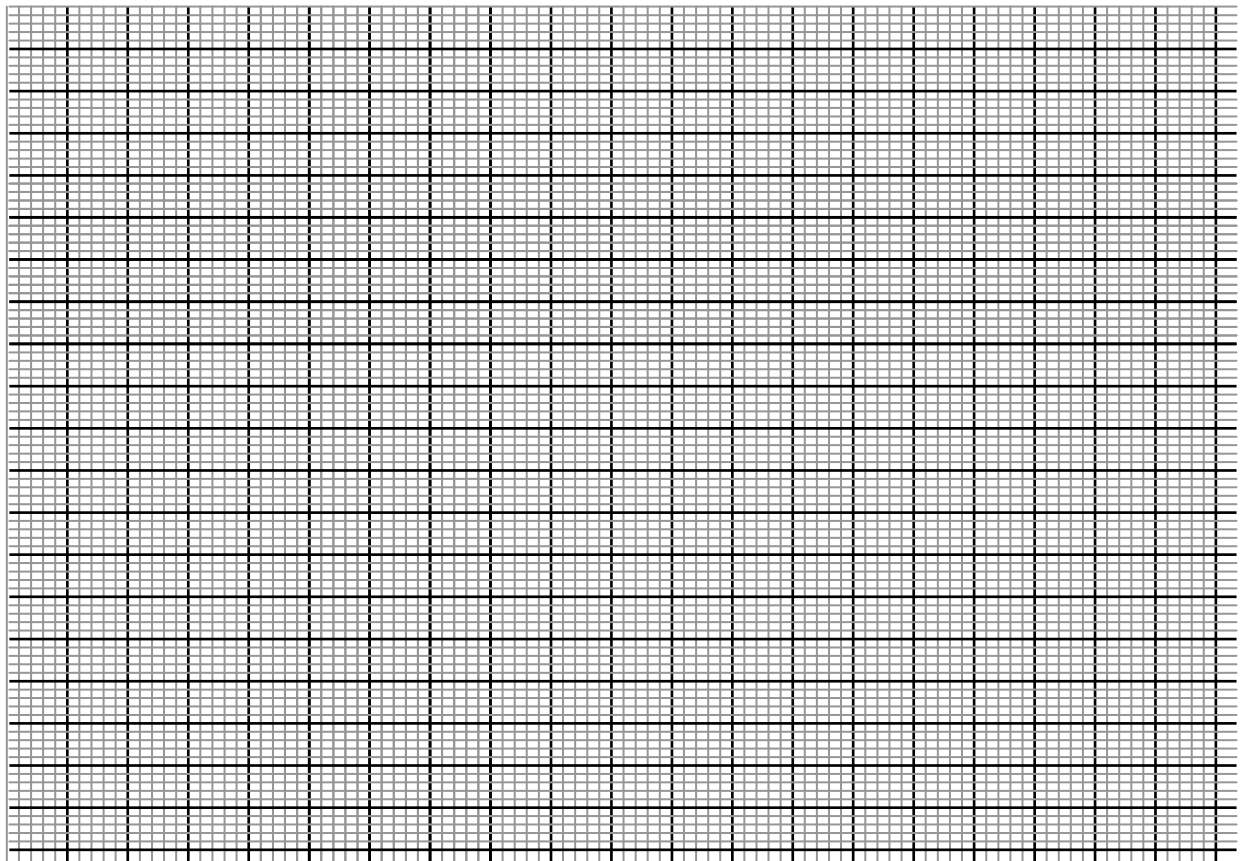
$$p + x = 50 + 20 = 70\text{ cm}$$

- (c) i) depth or height
 Density of the fluid.

- ii) They have wide webbed legs that increases the surface area hence the pressure they exact is low .

16 (a) Rate of change of angular displacement

(b i)) Graph



(c) i) Energy can neither be created nor destroyed but can only be changed from one form to another.

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

$$20 = 0t + \frac{1}{2} \times 10 \times t^2$$

$$t = 2\text{ s}$$