FORM FOUR CLUSTER KCSE MODEL1

PHYSICS PAPER 1 ANSWER

SECTION A (25 Marks)

Answer ALL questions in this section

1. Quantity S1 Unit

   Length - Metre

   Mass -Kilograms;; any two

   Time - Seconds

   Thermodynamic temperature -Kelvin

   Luminous intensity -Candela

   Electric current -Ampere

   Amount of substance -Mole

2.

Sleeve reading	6.50 mm
Thimble reading	13 x 0.01 =0.13 mm
	=6.63
Actual diameter (6.63+0.04)=6.67mm	

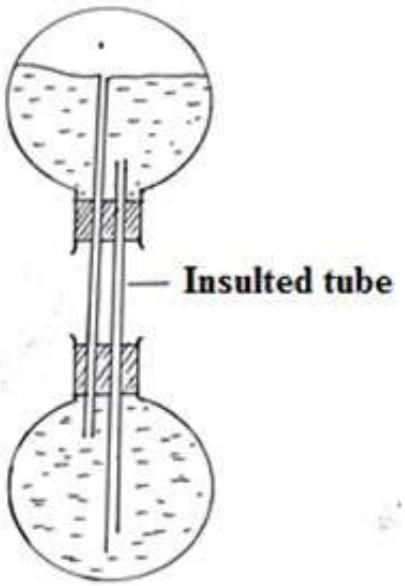
3. In (a) the cohesive forces are greater than adhesive forces hence water forms spherical drops.√1
   In (b) the adhesive forces are greater than cohesive force hence water spreads on the glass surface.√1

4. The flow continues; The flow depends on the pressure difference due to the height h;

5. Smoke particles are colliding with air particles which are moving in a random motion;

6. The level of liquid in the tube will first fall and then rises steadily. The fall is due to expansion of flask as it receive heat first. As heating continues the liquid get heated and hence a steady rise.

7.



8.

Sum of clockwise moments=sum of anticlockwise moments

$650d = (30-d)700 + (80-d)100$ √1

$650d = 2100 - 700d + 8000 - 100d$

$650d + 700d + 100d = 21000 + 8000$ √1

$d = \frac{29000}{1450} = 20$

$d = 20cm$ √1

9. The centre of gravity of B is lower than that of A thus B is more stable

10. It is a room where experiments are done from which observations and measurements taken help in making conclusion.

11. $F = Ke$

$K = 3 \times 60 = 180N/M$ √1

$e = \frac{?}{100} = 0.02M$

$F = Ke$ √1

=180 x0.02

=3.6N. √1

12. The fast moving air over the mouth of the flask causes a region of low pressure. The higher atmospheric pressure acting on the pith ball pushes it up;

13. $V = \pi r^2 h$;√

$0.01 = 500 \times 10^2 h$;√1

$h = \dfrac{0.01}{500 \times 10^2}$

$= 2 \times 10^{-7} MM$; √1

SECTION B (55 Marks)

Answer ALL questions in this section

14. a) The horizontal force acting on the bullet is zero.

b) i) $T = \dfrac{1}{f} = \dfrac{1}{100} = 0.01s$ √

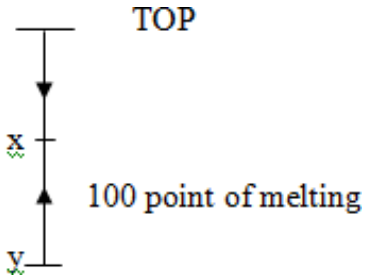
ii) Average velocity $= \dfrac{Total\ Dis\tan ce}{Total\ time}$ √1

$= \dfrac{4.0\,cm}{12 \times 0.01s}$ √1

$= 33.33 cm/s$ √1

$= 0.33$m/s

c) (i)



BOTTOM

$x + y = 100$

$x = \frac{1}{2}gt^2$ $\surd 1$

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

$= 5t^2$

$y = ut - \frac{1}{2}gt^2.$ $\surd 1$

$= 40t - 5t^2$

$x + y = 100$

$\therefore 5t^2 + 40t - 5t^2 = 100$

$40t = 100$

$t = 2.5s$ $\surd 1$

(ii) $y = 40t - 5t^2$ $\surd 1$

$= 40 \times 2.5 - 5(2.5)^2$

$= 100 - 31.25$ $\surd 1$

$= 68.75m \text{ from the ground}$

15. a) When a body is wholly or partially immersed in a fluid, it experiences an upthrust which is equal to the weight of fluid displaced.

b) (i) $w = mg$ $\surd 1$

$m = density + volume$

$= 0.8 \times 4 \times 4 \times 4$

$= 51.2g$ $\surd 1 \surd 1$

$w = \frac{51.2}{1000} \times 10 = 0.512N$

(ii) Upthrust = weight of fluid displaced

w=mg

$\frac{4 \times 4 \times 4 \times 1 \times 10}{1000} = 0.64N$

(iii) Tension= Upthrust – weight of block

$$0.64 - 0.512$$
$$= 0.128N$$

16. a) Direction of motion keeps on changing
b) Rate of change of angular displacement with time.

c)(i) $$F_A = \frac{MV^2}{r} - Mg$$
$$= 10 - 0.2 \times 10$$
$$= 8N$$

(ii) $$F_B = \frac{MV^2}{r}$$
$$= \frac{0.2 \times 5^2}{0.5}$$
$$= 10N$$

(iii) $$F_C = \frac{MV^2}{r} + Mg$$
$$= 10 + 2 = 12N$$

(iv)- It will snap at C
-Tension in the string is higher.

d) (i) $$\text{Slope} = mr;$$

$$\text{Slope} = \frac{1.3 - 1}{25 - 20};$$

$$= 0.06$$

$$M = \frac{Slope}{r}$$

$$= \frac{0.06}{1} = 0.06kg;$$

17. a) Specific latent heat of vaporization is the amount of heat required to change a unit mass of a liquid to vapor state without change in temperature

. b)(i) Mass of condensed steam= Mass of calorimeter and water + mass of condensed steammass of calorimeter and water.

123-120=3g=0.003kg√

(ii) Heat gained by calorimeter and water

$$=M_c C_c(\theta_2-\theta_1)\sqrt{}+M_w C_w(\theta_2-\theta_1)$$

$$=0.05\times 390\times 25+0.07\times 4200\times 25$$

$$=5737.5J\sqrt{}$$

(iii) Heat given out by steam =ML

=0.003LJ√

(iv)

$$0.003L=5737.5\sqrt{}$$

$$L=\frac{5737.5}{0.003}$$

$$=1.9125\times 10^6 J/kg\sqrt{}$$

c) (i) Temperature;

Pressure;

(ii) Volume of gas is constant;

(d)

$$\frac{P_1V_1}{T_1}=\frac{P_2V_2}{T_2}$$

$$\frac{1\times 500}{-73+273}=\frac{4V_2}{47+273};$$

$$\frac{500}{200}=\frac{4V}{320}$$

$$V=200cm^3;$$

18. a) Renewable resources are supplied by processes that can be re-used. Non-renewable resources supplied by processes that are exhaustible in nature.

b) Velocity ratio is the ratio of the distance moved by effort to the distance moved by the load.

c) (i) VR=3 ;

(ii) $E = \frac{MA}{VR} \times 100$;

$= \frac{\frac{400}{200}}{3} \times 100$;;

$= \frac{2}{3} \times 100$

$= 66.67\%$;

d) $MA = \frac{300}{50} = 6$

$\frac{6}{VR} \times 100 = 60$;

$VR = \frac{6 \times 100}{60} = 10$

$\frac{R}{r} = 10$;

$\frac{60}{r} = 10$ $r = 6cm$