KCSE CLUSTER TESTS 11

Physics Paper 1

SECTION A (25 Marks)

1. **Main scale reading =8.30 cm ½m**

Vernier scale reading =0.08 cm ½mk=8.38 cm 1 mk

2 marks

2. **The radiation is able to penetrate through the roof in but not out.√(1mark).In the green house there is high concentration of carbon dioxide which acts as an insulators and traps the heat.(1mark)√**

2 marks

3. **Due to change of gravitational field strength from one place to the other.**

1 marks

4. **Constriction –prevents the mercury from flowing back into the bulb before reading is taken**

2 marks

5.

$$P_g + P_w + P_{Hg} = P_a$$

$$P_g = P_a - P_w - PH_g$$

$$= 105000 - 1000 \times 0.3 \times 10 - 13600 \times 0.2 \times 10 \surd\surd$$

$$= 74{,}800 N/M^2 \surd$$

3 marks

6.

i) $T = \frac{1}{f}$

$f = \frac{150}{60} = 2.5 rev\ s^{-1} \surd 1$

$T = \frac{1}{2.5} = 0.45 \text{ sec} onds \surd 1$

ii) $\omega = 2\pi f \surd$

$= 2 \times 3.142 \times 2.5 \quad \surd$

$= 15.7 rads^{-1} \surd$

3 marks

7. **Unstable equilibrium. 1 mark**

-The C.O.G is lowered when given a slight displacement.√ OR
-When given a slight displacement it topples over.√ 1 mark for any

2 marks

8.

$$A_1V_1 = A_2V_2$$
$$1.2\times10^{-2}\times0.4 = 4\times10^{-3}\times V_2\ \sqrt{1}$$
$$V_2 = 1.2m/s\ \sqrt{1}$$

2 marks

9.

i) The body is stationery. (1mark)

ii) The body is moving with an acceleration.(1mark)

2 marks

10.

$$M_1U_1 + M_2U_2 = (M_1 + M_2)V\ \sqrt{1}$$
$$4\times12 = (6+4)V\ \sqrt{1}$$
$$V = 4.8m/s\ \sqrt{1}$$

3 marks

11.

Heat capacity is the heat required to raise the temperature of a given mass of a substance by 1K or 1^0C while specific heat capacity is the amount of heat energy required to raise the temperature of a unit mass of a substance by 1K or 1^0C.

2 marks

SECTION B (55 Marks)

12.

a) For a given mass of a gas the volume is directly proportional to absolute temperature provided that pressure is kept constant. (1mark)

b) i) -The water bath is heated to a certain temperature.

-The length of the trapped air column by the conc.sulphuric acid index at that temperature is measured using the metre rule.√ (1mark)

-A graph of the length of trapped air column against temperature in Kelvin is plotted.√ (1mark)
-The graph is a straight line with a positive gradient.√ (1mark)

ii) -To trap air column inside the capillary tube. (1mark)

-To dry the trapped air. (1mark)

iii) The atmospheric pressure remains constant throughout the experiment.√1

iv) Pressure.√1

8 marks

13.

a) The quantity of heat energy required to change a unit mass of a solid to liquid without change in temperature.√

b) i) $Q = MC\Delta\theta$

$= \frac{1200}{1000} \times 400 \times (69 - 68.4)\sqrt{1}$

$= 1.2 \times 400 \times 0.6 = 288J\sqrt{}$

ii) $Q = MC\Delta\theta$

$= 0.4 \times 4200 \times 0.6\sqrt{1}$

$= 1008J\sqrt{1}$

iii) $Q = mLf + MC\Delta\theta\sqrt{1}$

$= 0.002Lf + 0.002 \times 4200 \times 68.4\ \sqrt{1}$

$= 0.002Lf + 574.56$

iv) $0.002Lf + 574.56 = 1008 + 288\sqrt{1}$

$0.002Lf = 1296 - 574.56\ \sqrt{1}$

$0.002Lf = 721.44$

$Lf = \frac{721.44}{0.002}\sqrt{}$

$Lf = 3.6 \times 10^5\ Jkg^{-1}\sqrt{1}$

11 marks

14.

i) Work done by effort $= E \times \Delta E$

$= 420 \times 5.2\sqrt{1}$

$= 2184J\sqrt{}$

ii) Work done in raising the drum $= L \times D_L\ \sqrt{}$

$= 900 \times 5.2 \sin 25^0\sqrt{1}$

$= 1977.85J\sqrt{}$

ii) $Efficiency = \frac{workoutput}{workinput} \times 100$

$= \frac{1977.85}{2184} \times 100\sqrt{}$

$90.56\%\sqrt{}$

8 marks

15.

a) A floating body displaces its own weight of the fluid in which it floats.√1

b) i) Up thrust on the balloon= weight of air displaced.√

$100 \times 1.2 \times 10\sqrt{}$

$= 120\ N\sqrt{}$

ii) Weight of hydrogen $= 10 \times 0.09 \times 100\sqrt{}\sqrt{2}$

$= 90N\sqrt{1}$

iii) Lifting Force $= 120 - 90\sqrt{}$

$= 30N\sqrt{}$

9 marks

16.

b) i) $s = ut + \frac{1}{2}at^2$ √1

$49 = \frac{1}{2}a \times 7^2$ √1

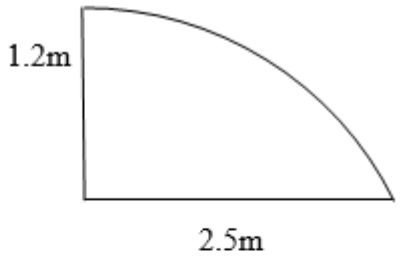
$a = \frac{49 \times 2}{49} = 2m/s^2$ √1

ii) $v = u + at$

$= 0 + 7 \times 2$ √1

$= 14m/s$√

c)



i) $h = \frac{1}{2} \times gt^2$

$1.2 = \frac{1}{2} \times 10 \times t^2$ √

$t^2 = \frac{1.2 \times 2}{10}$

$t = \sqrt{0.24}$ √1

$= 0.4899$ seconds.

ii) $R = ut$

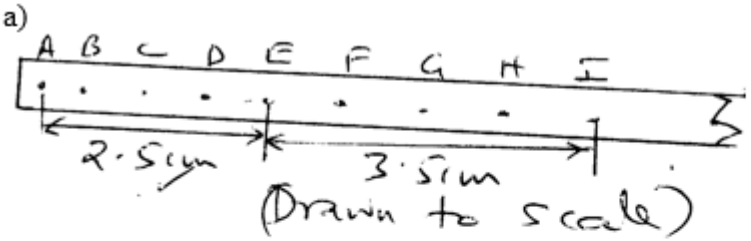
$2.5 = u \times 0.4899$ √1

$u = \frac{2.5}{0.4899} = 5.103m/s$√1

10 marks

17.

a)



b) i) Velocity between A &E., $V_{AE} = \frac{2.5}{0.02 \times 4} = \frac{2.5}{0.08}$ √1

$= 31.25cm/s \text{ or } 0.3125m/s$ √1

ii) Velocity between E and I, $V_{EI} = \frac{3.5}{4 \times 0.02}$ √1

$= 43.75cm/s$ √ or 0.4375 m/s

c) $\text{Acceleration} = \frac{V_{EI} - V_{AE}}{0.02 \times 4}$

$= \frac{0.4375 - 0.3125}{0.08}$ √

$= 0.7813 m/s^2$

9 marks