**FORM FOUR END OF TERM 2 EXAMINATION**

**Kenya Certificate of Secondary Education (K.C.S.E)**

**232/1**

**PHYSICS**

**PAPER 1**

**MARKING SCHEME**

1. -Reading = 2.32 cm (1 mk)

-Actual reading = 2.32 cm - 0.06cm = 2.26 cm ( 1 mk)

2. a) vacuum reduces heat transfer (gain or loss) by conduction and convection. ( 1mk)

-There is absence of material medium in the vacuum while both conduction and convection regquires a material medium( 1 mk)

3. -The metal bench ( 1 mk)

-The metal is a better conducrtor of heat than wood, it therefore conducts heat away from the body faster than the wood (1 mk)

4. -The stability reduces/decreases /lowers(1 mk)

-The position of center of gravity is raised because more mass is added to the upper part. (1 mk)

5. -Let the weight of the pan be x

Mass = 200g

Extension = 32 – 15 = 17 cm

K1 =$ \frac{F}{e}$

 = $\frac{x+2}{17}$

Mass = 250g

Extension = 35 – 15 = 20 cm

K2 = $\frac{F}{e}$

 = $\frac{x+2.5}{20}$ ( 1 mk) For both k1 and k2

K1 = k2 since springs are identical

$\frac{x+2}{17} $ = $\frac{x+2.5}{20}$ ( 1 mk)

X = 0.833333333 N

Mass of the pan

W = mg

m = $\frac{0.8333}{10}$

m = 0.08333 kg ( 1 mk)

m = 83.33 g

6. -This is when the upwards forces equals the downwards forces(1 mk)

-The net ( resultant) force is zero/ the acceleration is zero ( 1 mk)

7. - Gases have larger intermolecular distances than in solids and in liquids

8. -pressure of the gas, Pg= Pa+ hρg (1 mk)

 hρg = $\frac{20}{100}$ X 13600 X 10

 = 27,200N/m2 (1mk)

Pg= 103360 + 27200

 = 130,560 N/m2 (1 mk)

9. -The bulb of the thermometer is heated first and expands, the level of the mercury falls. ( 1mk)

-Later, the mercury in the bulb is heated and expands more than the bulb, this makes the level of mercury to rise. ( 1 mk)

10. clockwise moments = anticlockwise moments

OR F1d1= F1d1 ( 1 mk)

24 x 50 = 16( 100 – x) ( 1 mk)

1200 = 1600 – 16x

X = 25 cm ( 1 mk)

11. $\frac{P1V1}{T1}$ = $\frac{P2V2}{T2}$

T1 = 27 + 273 = 300K

T2 = 67 + 273 = 340K

P1  = P2 since pressure is constant

$\frac{V1}{T1} $ = $\frac{V2}{T2}$ (1mk)

$\frac{200}{300}$ = $\frac{V2}{340}$ (1mk)

V2 = 226.67 ml ( 1 mk)

12. a) a floating object displaces its own weight of the fluid in which it floats. 1mk

b) i) U = Vρg ( 1 mk)

 = $\frac{8}{100}$ X $\frac{5}{100}$ X $\frac{10}{100}$ X 800 X 10 ( 1 mk)

 = 3.2 N ( 1mk)

ii) density = $\frac{mass}{volume}$

W = 3.2 N since the object is floating

m = $\frac{W}{10}$

 = $\frac{3.2}{10}$

 = 0.32 kg or 320 g ( 1 mk)

 Density = $\frac{320}{8 x 5 x20}$ ( 1 mk)

 = $\frac{320}{800}$

 = 0.4 g/cm3( 1 mk)

OR V = $\frac{8}{100}$ X $\frac{5}{100}$ X $\frac{20}{100}$

 = 8.0 X 10-4 m3

 Density = $\frac{0.32}{0.0008}$

 = 400 kg/ m3

c) put some sand into the testtube. ( 1mk)

put some water into the beaker about $^{3}/\_{4}$ full.

Dip the testtube with its contents into the water in the beaker.

Mark the level of water on the testtube as 1. ( maximum). ( 1 mk)

Pour the water from the beaker and replace it with kerosene about $^{3}/\_{4}$ full.

Dip the testtube with its contents into the kerosene in the beaker. Mark the level of kerosene on the testtube as 0.8 ( minimum). ( 1 mk)

Divide the interval in equal divisions to read relative densities in that range. ( 1 mk)

13. a) Mechanical advantage is the ratio of Load to Effort. 1mk. Reject formula M.A=L/E

1. i) V.R = $\frac{effort distance}{load distance}$ ( 1 mk)

 V.R = $\frac{revolutions made by the effort wheel ( gear)}{revolutions made by the load wheel ( gear)}$

 ( 1 mk)

- if the effort gear makes 1 revolution, the load gear makes **P/Q** revolutions.

V.R = $\frac{1}{P/Q}$ ( 1 mk)

V. R =  **Q/P**

ii) V.R = Q/P

 P = 10

 Q = 30

V.R = $\frac{30}{10}$

 = 3 ( 1 mk)

M. A = $\frac{L}{E}$

 = $\frac{1800}{800}$

 = 2.25 ( 1 mk)

Efficiency = $\frac{M.A}{V.R}$ X 100

 = $\frac{2.25}{3}$ X 100

 = 75 % ( 1 mk)

(Working of efficiency must be shown)

1. Work done by the system = F X d

= 1800 X 0.8

= 1440 J

Efficiency = $\frac{work done on the load}{work done by the effort}$ X 100 ( 1 mk)

 75 = $\frac{X}{1440}$ X 100 ( 1 mk)

 X = $\frac{75}{100}$ X 1440

 X = 1080 J ( 1 mk)

14. i) -increasing the speed of rotation/increasing the rate of whirling/increasing frequency of rotation. (1 mk)

-reducing the radius of the circular path. ( 1mk)

ii) – weight of the object ( 1mk)

 - Tension in the string. ( 1mk

Velocity

iii)

Force

1. There is change in the direction of the velocity because the direction of motion of the object changes with time. ( 1 mk)
2. I) f = 3 Hz

Ѡ = 2πf ( 1 mk)

 = 2 π X 3 ( 1 mk)

 = 6 π

 = 18.85 rad/s ( 1 mk)

II) T = mr Ѡ2 + mg ( 1 mk)

 = 0.2 X 18.85 X 18.85 X 1.2 + 0.2 X 10

 ( 1 mk)

= 85.2774 + 2

= 87.28 N ( 1mk)

15. a) specific latent heat of fusion is the amout of heat energy required to change the state of a unit mass of substance from solid state to liquid state without change in temperature. ( 1 mk)

b) i) I) mass of condensed steam

 = 264 – ( 150 + 100)

 = 264 – 250

 = 14 g ( 1 mk)

II) H = mccc∆θ + mwcw∆θ

 = $\frac{100}{1000}$ X 400 X 50 + $\frac{150}{1000}$ X 4200 X 50

 ( 1 mk) ( 1 mk)

 = 2000 + 31500

 = 33500 J ( 1mk)

ii) heat lost = heat gained

heat lost by steam = $\frac{14}{1000}$ X L + $\frac{14}{1000}$ X 4200 X 32

 ( 1 mk)

 = 0.014 L + 1881.6 ( 1 mk)

0.014L + 1881.6 = 33500 ( 1 mk)

0.014L = 31618.4

 L = $\frac{31618.4}{0.014}$

 = 2,258,457.143 J /kg ( 1 mk)

1. – impurities (1 mk)

- pressure ( 1 mk)

16. a) i) V = U + gt

 V = 0 + 10 X 2.5

 = 25 m/s ( 1 mk)

ii) V2 = U2 + 2gs

 25 X 25 = 0 x 0 + 2 X 10 X h

 20h = 625

 h = 31.25 ( 1 mk)

iii) V2 = U2 + 2as

 0 X 0 = 25 X 25 + 2 X a X 0.125

0 = 625 + 0.25a

a = - 2500m/s2 ( 1 mk)

retardation = 2500 m/s2 ( 1 mk)

b) for a system of colliding bodies, the total linear momentum remains constant provided no external forces are acting. ( 1 mk)

c) – use of rollers

- use of ball bearings

- lubrication ( oiling or greasing )

( any two for 2 mk)