KENYA NATIONAL EXAMINATION COUNCIL

KCSE 2009

PHYSICS

PAPER 1

MARKING SCHEME

1. Volume run out= 46.6 cm^3

   Density = $^m/_v$ = 54.5 / 46.6 = 1.16953

   = 1.17g/ cm^3

2. $T^2 = 4 \Pi \, ^{2L}/g$

   $= 1.7^2 = \frac{4 \Pi^2 \times 0.705}{g}$

   $g = 9.63 m/s^2$

3. Needle floats due to the surface tension force

   Detergents reduces surface tension, so the needle sinks

4. When equal forces applied, pressure on B is greater than on A due to smaller area./ pressure differences is transmitted through to liquid causing rise upward. Force on A is greater than hence upward tension.

5. Molecules inside warm water move faster than in cold water. For Kinetic energy in warm water is higher than in cold water/ move with greater speed/ molecules vibrate faster in warm water.

6. Prevents/ holds, traps breaks mercury thread/ stops return of mercury to bulb when thermometer is removed from a particular body of the surrounding

7. Dull surface radiate faster than bright surface

   P- Looses more of the heat supplied by burner than Q OR

   Q shinny surface is a poorer radiator/ emitter of heat thus retains more heat absorbed Or

P- Dull surface is a better radiator/ emitter i.e. retains less of the heat absorbed. (there must be a comparison between P & Q)

8. Heat travels from container to test tube by radiation so the dull surface P, gives more heat to the test tube.

9. Center of gravity located at the intersection of diagonals

10. Parallel

F= 2 ke

40= 2 x ke

$E_1 = {}^{40}/_{2k} = {}^{20}/_{k}$

Single = f= ke_2

20 = ke_2

E_2 = 20/k

$E_T = e_1 + e_2$

20 = 20 /k + 20/k

20 k = 40

K= $^{40}/_{20}$ = 2N/cm

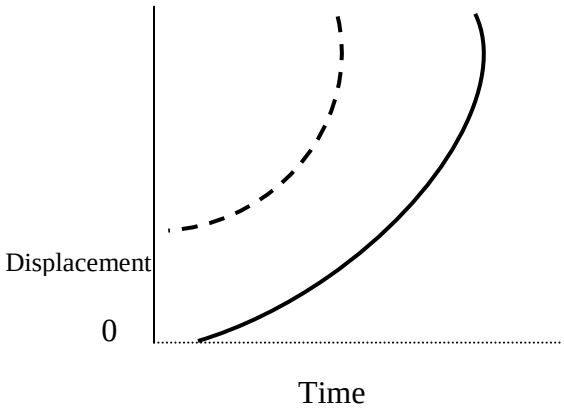
OR Extension of each spring = 10

K = 20N/ 10 cm

- 2N/ cm

11. Air between balloon is faster that than outside so there is pressure reduction between.

12.



13. The lowest temperature possible/ Temp at which ideal gas has zero volume (Zero pressure) or molecules have zero / minimum energy OR

Temperature at which a gas has min internal energy/ zero volume

14. V= r x 21

= 0.08 x 21 V 33m/s

= 16.6m/s

OR T = 1/33 = 0.030303

T = 2V / w =

w = 2v/0.0303 = 207.525

V= rw

0.08 x 207. 5292

= 16.5876m/s

SECTION B (55 MARKS)

15. (a) - Pressure

- Dissolved impurities

(b)

(i) BPt = 78^0C

(ii) (I) Δt = 4.5 min

Q = pt = 50 x 4.5 x 60J

= 13500J

(II) Q = 70 - 16 = 54^0C *(accept 54 alone or from correct working)*

(III) Q = MC $\Delta\theta$

C= 13500J

0.1kg x 54k

= 2500J/ kj

(iii) Δ t = (7.3 – 6.8) min = 30s

Q = pt = ml = 30x 50J

L= $\frac{30 \times 50}{0.18}$ = 83.33 x 10^5J/kg

16. (a) Efficiency = $\frac{\text{work output}}{\text{Work input}}$ x 100% (equivalent)

OR Ratio of work output to work input expressed as a percentage

(b) (i) work effort = F x S

= 420 N x 5.2 N

2184J

(ii) Distance raised = 5.2 sin 25 = 2.2 m (2.1976)

Work done = 900N x 2.2 m

= 1980J

(iii) Efficiency = work output x 100% = $\frac{1980}{2184}$ x 100
Work input

= 90.7%

17. (a) A floating body displaces its own weight of the fluid on which it floats

(b) (l) w = T + U

(ii) Vol = 0.3 x 0.2 x 0.2m^3

Weight = mg = 0.3 x 0.2 x 0.2 x 10500 kg/m^3 x 10

= 1260N

(iii) Vol of liquid = vol of block

Weight of liquid displaced = Vpg

0.3 x 0.2 x 0.2 x 1200 x 10N

= 144N

(iv) T = w - u

1260 – 144N

1116N

(c) Weight of solid = weight of kerosene displaced

= 800 x 10 x 10^{-6} x 10 = 0.08 N

Mass = 0.008 kg

Vol = 50 cm^3 Density $^{m}/_{v}$ = $^{0.008}/_{50 \times 106\ m^3}$

18. (a) The pressure of a fixed mass of an ideal gas is directly proportional to the

Absolute temperature if the volume is kept constant.

(b)

(i) Volume increases as bubble rises because the pressure due to liquid column is lowered; therefore the pressure inside bubbles exceeds that of outside thus expansion.

(ii) (I) Corresponding pressure = 1.88×10^5 Pa

(II) $I/v = 1/1.15 = 0.87\ cm^{-3}$

(iii) $\Delta P = (1.88 - 0.8) \times 10^5$ pa = 1.08 x 105 Pa

$\Delta P = \ell gh = \ell \times 0.80 \times 10$

$$P = \frac{1.08 \times 10^5\ kg/m^3}{0.80 \times 10}$$

$= 13500\ kg/m^3$

(iv) Pressure at top = atmospheric

0.8×10^5 pa

c. $^{p1v1}/_{T1} = {}^{p2v2}/_{T2}$ $= \frac{2.7 \times 10^5 \times 3800}{298} = \frac{2.5 \times 10^5 \times v_2}{288}$

$25^0C = 298$ k $= 3966\ cm^3$

$15^0c = 288k$

19. (a) Rate of change of angular displacement with time
Acc. Without (rate)

(b)

(i) Mass, friction, radius (any two)

(ii) Oil will reduce friction since frictions provide centripetal force; the frequency

for sliding off is lowered.

(c) $v^2 = u^2 + 2as$

$= 0 + 2(0.28)h$

$V = \sqrt{0.56 \times 1.26}$

$= rw$

$= 0.84 = 0.14 \times w = \frac{0.84}{0.14} = 6$ rad s

ANSWERS:

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