KENYA CERTIFICATE OF EDUCATION
PHYSICS PAPER 1
2017

MARKING SCHEME

1. *Temperature ✓1*
2. a)Find the density of the liquid, given that density of water is 1000kgm^{-3}. (3marks)

$$\text{Relative density} = \frac{\text{Mass of liquid}}{\text{Mass of equalvolume of water}} \checkmark$$

$$= \frac{695 - 20}{70 - 20} \checkmark$$

$$= \frac{675}{50}$$

$$= 13.5 \checkmark$$

$$R.d = \frac{e_L}{e_W} \Rightarrow 13.5 = \frac{e}{1}$$

$$e_L = 13.5gcm^{-3}$$

(a) mass of the liquid. (3marks)

$M = eV$

Mass of water = 50g ✓

Volume = ✓

= 50cm³ ✓

3. *The cohesion force between the water molecules is greater than adhesion force between water molecules and the waxed glass surface ✓1*
4. Give a reason why mercury is preferred for use in a thermometer. (1 mark)

Has uniform expansion ✓

5. *PA + h2p2g = pg + h1p1g ✓*

1.02 x 105 + 0.12 x 800 x 10

= Pg + 0.08 x 1800 x 10✓

102000 + 960 = pg + 15168

pg = 1.014 x 105Pa ✓

6. *Because intermolecular forces in gases are weaker than in solids ✓*
7. (a) Name the instrument. (1 mark)

Barometer ;

(b) Name the liquid marked L. (1 mark)

Mercury

8. *Clockwise moments = Anticlockwise moments.* ✓*1*
   W × 1.6 = T × 0.4
   40 × 1.6 = T × 0.4 ✓*1*
   T = 40 × 1.6 = 160N ✓*1*
   0.4
9. *Standing with feet apart increases stability by lowering COG (increases base area)* ✓1

10. *At B; (narrowest part) because of C.S.A is smallest* ✓1*hence the air moves faster in that region;* ✓1
11. *Pressure reduces* ✓*1*
12. .
    a) What extension is produced by the sand?
    (15.0 - 5.0cm) = 10cm✓*1*

    b) What extension is produced by the 20g mass?
    30cm - 15) = 15cm✓*1*
    c) What is the mass of the sand? (3 marks)
    20g -- 10cm
    ? 15cm
    20 × 15 = 30g ✓*1*
    SECTION B

13. (a) Differentiate between displacement and speed. (2 marks)
Displacement is the distance moved by a body in a specified direction is called displacement while Speed is the distance covered per unit time.

b)- B
- Acceleration of A is greater than that of B and thus A needs greater force than B.

c) i) $V^2 = U^2 + 2as$
$48^2 = 26^2 + 2 + 2 \times S$
$S = \frac{48^2 - 26^2}{4}$
$= 407m$

ii) $F = \frac{m(v-u)}{t}$
$= \frac{27(0-48)}{12}$
$= -168N$

d) A body moving with uniform acceleration of 10 m/s^2 covers a distance of 320 m. if its initial velocity was 60 m/s. Calculate its final velocity.
(3 marks)
$V^2 = u^2 + 2as$
$= (60) + 2 \times 10 \times 320$
$= 3600 + 6400$
$= 10,000$
Therefore $v = (10,000)^{1/2}$
$v = 100$m/s

14. (a) streamline flow – particle passing a point have the same velocity turbulent flow particles passing a through a point have varying velocity

(ii)air particle between them move with high velocity hence reducing pressure between them

(iii) $A_1V_1 = A_2V_2$

0.05 X22 =11X4 ✓*1*

A_2 = 1.1/1.1 =1M^2

1 =$\frac{22}{7}$ r^2

$\frac{7}{22}$ =r = 0.564✓*1*

$diameter$ =0.564 x2 = 1.128✓*1*

15. a)i) The rate of change of momentum is directly proportional to the resultant force and take direction of force.

ii) To increase the time of landing to lower reduce the impulsive force.

b) i)

ii) F= ma

= 100 × 10

= 1000N

c) i) Elastic collision is one in which bodies bounce off each other after impact while inelastic collision is one in which bodies stick together after impact.

ii) m1u1 + m2u2 = (m1 + m2) v

800u - 5000 × 40 = 58000 × - 10

u = 1776.5m/s

16. (a) W-Fluid reservours√

X-release value√

Y-Load piston√

(b)Effort applied downwards causes high liquid pressure below pump piston√. This keeps valve A closed while B opens so that liquid flows to force up the load piston hence raising the load√

(c)So as during upstroke atmospheric pressure causes valve A to open to let fluid into P√

(d) - Increasing the cross-sectional area of Q√

- Reducing the cross sectional area of P√

(e) If force p is F1

Then P1= F1/A=F1÷ 5/ 100x100√

But this is the pressure transmitted to Q

∴P at Q=F2/A

$$2000\,F_1 = \frac{1200\,x1000}{500}$$

F1=120N

17. a) State HOOKE'S LAW. (1 mark)

The extension of a spring is propo-rtional to the applied force, provided that the force is not large enough to deform the spring permanently.

b) i) What is a spring constant? (1 mark)

The spring constant is a measure of the stiffness of a spring.

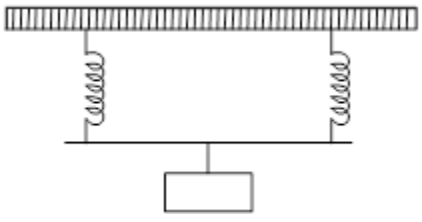
ii) Explain three factors determining spring constant.

(6 marks)

- Material - identical springs mad of different materials will have different constants i.e. steel and copper.
- Diameter - the stiffness decreases with the increase in diameter.
- Thickness of the wire - a spring made of a thicker wire is stiffer than the one made of thin wire of the same material.
- Length of spring - a short spring is stiffer than a longer one.
- Number of turns per unit length - a spring with higher number of turns per unit length is less stiff than the one with fewer turns per unit length.

(b) Two identical springs of spring constant 3N/cm are used to support a load of 30N as shown in the figure below. Determine the extension of each spring.

(3 marks)



Weight on each spring is

$$F = Ke$$

$$\therefore e = \frac{F}{k} = \frac{15N}{3N/cm}$$

$$e = 5cm$$