KANDARA SUB-COUNTY FORM 3 JOINT EVALUATION

Kenya Certificate of Secondary Education

PHYSICS
Paper 1
October 2016

MARKING SCHEME

1. Reading = 6.45mm
diameter = 6.45 - 0.14
= 6.31mm ✓

2. $x = ut + \frac{1}{2}gt^2$
$= 0 + \frac{1}{2} \times 10 \times 4^2$ ✓
$= 80m$

3. $\frac{V_1}{T_2} = \frac{V_2}{T_2}$
$V_2 = \frac{V_1}{T_1} \times T_2$
$= \frac{200 \times 370}{300}$
$= 246.67cm^3$ ✓

4. $V = \frac{m}{\rho} = \frac{1.8}{9 \times 10^2}$

mass $= \frac{1.8}{9 \times 10^2} \times 1000$ ✓ $= 2kg$ ✓

5. Clockwise moments = anticlockwise moments
$F_1 \times d_1 = F_2 d_2$ ✓
$2 \times 30 = W \times 10$
$W = \frac{60}{10} = 6.0N$ ✓

6. $A_1V_1 = A_2V_2$
$24 \times 9 = A_2 \times 6$ ✓
$A_2 = \frac{24 \times 9}{6} = 36cm^2$ ✓

7. a) Adhesive forces between water molecules and glass are stronger than cohesive force between water molecules ✓

b) Density reduces. This is because mass remains constant but volume increases ✓

8. $t = \frac{V}{A} = \frac{1 \times 10^{-6}}{3.14 \times 10^{-4}}$ ✓ $= 3.183 \times 10^{-3}m$ ✓

9. Black surfaces are better absorbers of heat than white / shiny hence white feels cooler ✓

10. $W = ke$ ✓
$= 75 \times 0.35$ ✓
$= 26.25N$ ✓

11. $P_{max} = \frac{\text{force}}{\text{min area}}$ ✓ $= \frac{6.0}{0.004} = 15000N/m^2$ ✓

12. - mercury is dense heavy ✓
- mercury does not stick on glass ✓

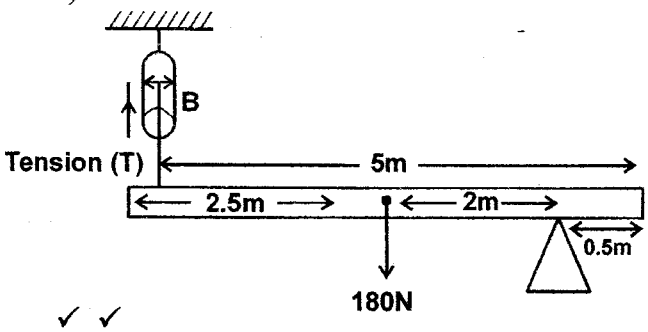
13. a) For a helical spring the extension is directly proportional to the force producing it provided that elastic limit is not exceeded ✓

b) i) let original length be = x
$e = 13 - x$ and $e = 15 - x$ } for both
$e = \frac{f}{k} = \frac{50}{k}$ and $\frac{80}{k}$ }
$\therefore 13 - x = \frac{50}{k}$ and $15 - x = \frac{80}{k}$ ✓ both
$15k - kx = 80$ }
$13k - kx = 50$ } ✓
$2k = 30$
$k = 15$ ✓

ii) $k = 15$ ✓
$x = 13 - \frac{50}{15}$

$x = 9.667cm$ ✓

c)



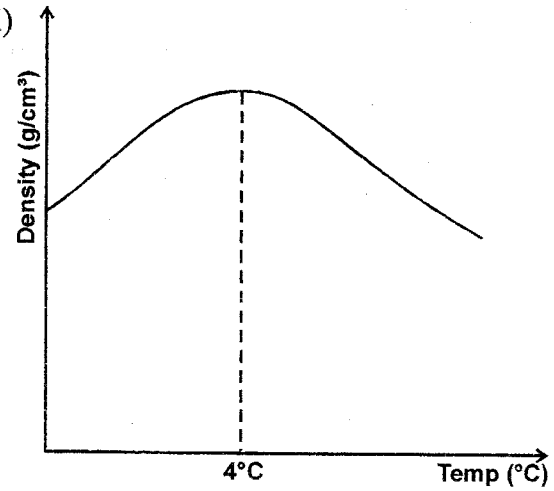
✓ ✓

ii) $T \times 4.5 = 180 \times 2$ ✓
$T = \frac{360}{4.5}$ ✓ $= 80N$ ✓

14. a) Temperature measured in Kelvin while heat is measured in Joules ✓

b) i) $P = 4°C + 273$ ✓
$= 277K$ ✓ } accept $4°C$ ✓✓

ii)



Correct shape with maximum at 4°C

iii)I. Heat supplied (Q) = P x t
$= 300 \times 5 \times 60$
$= 90{,}000$ Joules ✓

II. Heat capacity $= \frac{(Pt)}{\Delta\theta}$ ✓
$= \frac{90{,}000}{40}$ ✓ $= 2250JK^{-1}$

III. $2250 = MC$ ✓

$M = \frac{2250}{C} = \frac{2250}{4200}$ ✓ $= 0.5357kg$

15. a) Friction ✓
Weight of lower block ✓

b) i) To change direction of effort ✓
ii) I. V.R = 6 ✓
II. $M.A = \frac{L}{E}$ ✓
$= \frac{284}{71}$ ✓
$= 4$ ✓

III. $E = \frac{M.A}{V.R} \times 100\%$ ✓
$= \frac{4}{6} \times 100$
$= 66.67\%$ ✓

16. a) Thermometer ✓
Bunsen burner / heater ✓ } (could be in the diagram)

b) To distribute heat equally / uniformly for uniform heating of air ✓

c) To measure the pressure of the air at various temperatures ✓

d) $-273°C$

e) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$
$\frac{1.5 \times 10^5 \times 1.6}{285} = \frac{1.0 \times 10^5 V_2}{273}$ ✓

$V_2 = \frac{1.5 \times 10^5 \times 1.6 \times 273}{285 \times 1.0 \times 10^5}$ ✓
$= 2.299m^3$ ✓

17. a) Impulse equal change in momentum or force x time ✓

b) i) Impulse = mv = mu
$= 1000 \times 0 - 1000 \times 10$ ✓
$= -10{,}000kgm/s$ ✓

ii) Impulse = Ft
$F = \frac{-10000}{0.4}$ ✓ $= -25{,}000N$ ✓

c) i) When two or more bodies collide their total momentum remains a constant provided no external forces are acting ✓

ii) I. $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$ ✓
$5 \times 10 + 10 \times 4 = 5 \times 7 + 10V_2$ ✓
$90 = 35 + 10V_2$
$V_2 = \frac{90 - 35}{10}$ ✓
$= 5.5m/s$ ✓

II. Elastic collision ✓