FORM FOUR TERM ONE EXAM 2017

PHYSICS PAPER 1
MARKING SCHEME

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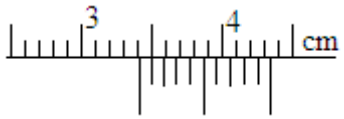
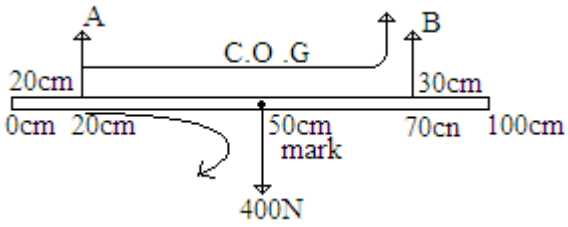
PHYSICS PAPER 1
MARKING SCHEME

1. (i) New reading of burette = 48 cm^3 (1 mark)
   (ii) New reading of cylinder = 21 cm^3 (1 mark)
2. vernier callipers



(1 mark)

3.



$400 \times 30 = B \times 50$

$B = \frac{400 \times 30}{50}$

$B = \frac{1200}{5}$

$B = 240N$

(3marks)

$A = 400 - 240$

$A = 160N$ (3 marks)

4. Pressure = ρgh

$= 1.36 \times 10^4 \times 10 \times 0.760$

$= 1.0336 \times 10^5 N/m^2$

5. Smoke particles are being hit by unseen air molecules moving in a random motion (1 mark)
6. Wire gauze is a good conductor of heat and hence conduct heat away from the upper region of the wire gauze the gas reaches its ignition temperature later when the flame starts showing on the upper region.
   (2 marks)
7.
   - Water is sucked in to the glass tube
   - Air in the flask contracts when cooled.lowering pressure inside (2 marks)

8. [3 marks]

$F = ma_1$ $\qquad a_2 = \frac{ma_1}{2m}$

$F = 2mA_2$

$MA_1 = 2mA_2$ $\qquad a_2 = \frac{1}{2}a_1$

9.

$F = Ke$

$3 = K \times 1.5$

$K = \frac{3}{1.5}$

$K = 2 \ \ g/cm$

$F = Ke$

$I = 2 \times e$

$e = 1/2$

$e = 0.5$

$X = 0.5 + 3.5$

$X = 4.0cm$

(3 marks)

10. High velocity air creates a low pressure inside the funnel Air outside push the ball into the low pressure area. (2 marks)

11.

$P.E = K.E$

$mgh = 1/2\, mv^2$

$gh = v^2/2$

$h = \frac{v^2}{2g}$

$h = \frac{2.5 \times 2.5}{2 \times 10}$

$h = \frac{625}{20}$

$h = 3.125m$

[3 marks]

12. (a) Work is done if a body moves in the direction of the force √

(b) (i) Cell√
(ii) Light√
(iii) Heat √
(iv) Motor√
(v) Sound √

(c) (i) $\frac{\text{Power output}}{\text{Power input}} = 0.7$ √

$\frac{350 \times 15 \times 10}{60 \times \text{power input}} = 0.7$√

Power input = $\frac{350 \times 15 \times 10}{60 \times 0.7}$

= 1250w√

(ii) Power lost = $\frac{30}{100} \times 1250$ √

= 375w√

Energy lost per s= 375J/S√

13. (i) Mass of metal block = m
Ammeter reading = I
Voltmeter reading = v
Time taken to heat the block = t
Initial temperature of block = θ_1
Final temperature of block = θ_2

6 @ ½ mk

(ii) Assuming no heat to the surrounding the electrical energy supplied by the heater is equal to heat gained√ by the metal block

VIt = $mc(\theta_2 - \theta_1)$ √

C = $\frac{vit}{m(\theta_2 - \theta_1)}$

(iii) (I) lagging – to insulate the set – up from heat loss√ prevent heat loss or gain to or from the surrounding.

(II) Drops of oil – to improve thermal contact with the heater and thermometer. √

(b) Let m be mass of steam

Heat gained by water + heat gained by the can = heat lost by steam + heat lost by hot water

ΔT_1 for cold water = 55 – 15 = 40k

ΔT_1 for can = 55 – 15 = 40

ΔT_2 for hot water = 100 – 55 = 45

$M_w C\Delta T_1$√+ $C\Delta T_1 = ML + MC\Delta T_2$√

0.2 x 4200 x 40 + 600√ x 40 = M x 2260000 √+ M x 4200 x 45

33600 + 24000 = 2260000M + 189000M

57600 = 2449000M

M = 0.02352kg √

= 23.52g

14. - Radius of the circular path √1

- Nature of the road √1Roughness of road surface.

- Condition of the tyres Roughness of the tyres

Any two correct

(b) Frictional force provides the centripetal force

$Fr = \frac{mv^2}{r}$ √1

$v = \sqrt{\frac{Fr \times r}{m}}$ $= \sqrt{\frac{6500 \times 25}{1000}}$ √1

$\sqrt{6.5 \times 25}$

= 12.75m/s √1

(c) (i) m = 0.2kg, r = 0.32m

At lowest point $T = \frac{mv^2}{r} + mg$

$\frac{MV^2}{r} = T - mg$ √1

= 10.5 – 2

= 8.5

$V^2 = \frac{8.5 \times 0.32}{0.2}$

$V = \sqrt{\frac{8.5 \times 0.32}{0.2}}$ √1

= 3.688m/s √1

(ii) At the uppermost $\frac{MV^2}{r} = T + mg$

$T = MV^2 - mg$

$\frac{}{r}$ √1

$= \frac{0.2 \times (3.688)^2}{r} - 2$

$= \frac{0.2 \times (3.688)^2}{0.32} - 2$ √1

= 8.50 – 2

= 6.5N √1

15.a) (i)When an object is partially or totally submerged, it displace a fluid whose weight is equal to the upthrust.or when a body is totally or partially immersed in a fluid it experiences and upthrust equal to the weight of the fluid displaced. √1

ii) I volume of water displaced 6.0m^3 = 6.0 m^3√1
∴ Mass of water= density x volume = 6600kg √1
∴ Wt of water displaced = 6600 x 10N = 66000 N √1

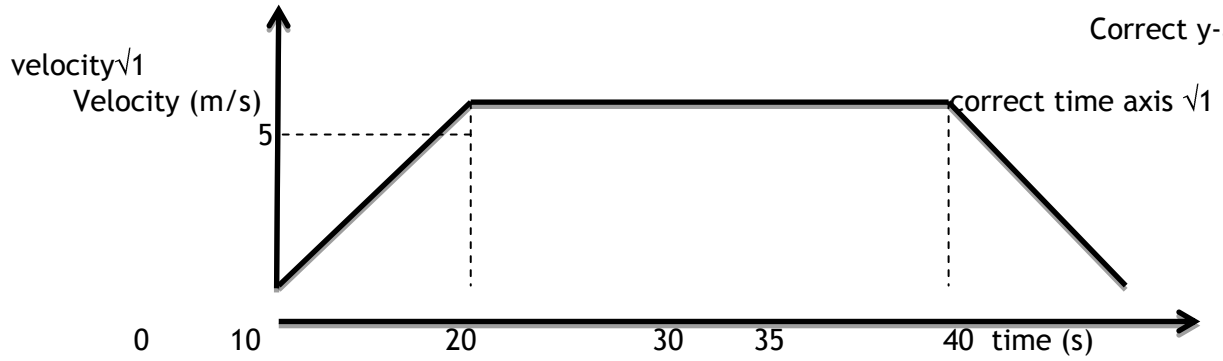
II From Archimedes principle,
Upward force = 66000N (upthrust) √1

III U = W + T √1
66000 = 1000 + T
T= 66000N- 1000N
T = 56000 N √1

b) i) Volume of water displaced = 5 x 4 = 20cm^3√1
Mass of displaced water= density x volume = 20g
Mass of test tube + lead shots = 20g (law of floatation) √1
Mass of lead shots = 20g – 10g = 10 g √1

ii) Mass of liquid displaced = 20g √1
Volume of displaced liquid = 20/0.75 = 26.667 cm^3
length of submerged tube = m/v = 26.667/5 = 5.33cm. √1

16.
a) i) Velocity after 10s = at =0.5 x 10 = 5m/s



(ii) Average speed = Distance / time = area under the graph / time √1

= $\frac{0.5(25 + 40) \times 5}{40}$√1

= $\frac{162.5}{40}$

= 4.06 m/s √1

(b) $v^2 = u^2 + 2as$ √1
$= 10^2 - 2 \times 2 \times 24$ √1
= 100 – 96
= 4
v = 2 √1