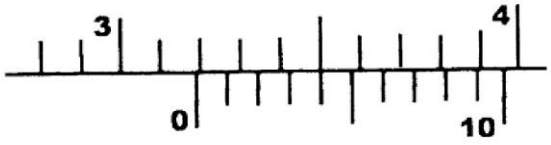
4.6 PHYSICS (232)

4.6.1 Physics Paper 1 (232/1)

SECTION A

1.



Correct reading √(1)

2. Volume = 21 - 19
= 2 cm³ √

Volume of 1 drop = $\frac{2}{50} = 0.04\ cm^3$ √ 2

3. $Mg_e = Ke_e \therefore K = \frac{Mg_e}{e_e}$ √

$Mg_m = Ke_m$ (K is constant)

$Mg_m = \frac{Mg_e}{e_e} . e_m$ √

$g_m = \frac{g_e . e_m}{e_e} = \frac{10 \times 0.01}{0.06} = 1.67 NKg^{-1}$ √ (3)

4.
- depth √
- density of the liquid √
- gravitational field strength √ 2

5. The sharp heeled shoe exerts great pressure √ due to small surface area of contact √ 2

6. (a) - freezing √

(b) - The intermolecular forces are weaker √ 1

7. Both containers have a greater √ expansion compared to glass, but A expands faster than B √ 2

8. Sum of anti clockwise moments = sum of clockwise moments √

$4 \times 35 + T \times 50 = 8 \times 40$

$140 + 50T = 320$ √

$T = \frac{320 - 140}{50}$

$= 3.6\ N$ √ 3

9. The velocity of air above B is greater than that above A √ decreasing the pressure above B hence the water rises higher in B √ 2

10. As the balloon rises, the atmospheric pressure reduces √ hence the pressure due to the hydrogen gas pushes the walls of the balloon to expand √ 2

11. To maintain stability √ (1)

12. B √

- As the heating continues the hot water rises conventionally, due to the reduced density the hot water remains at the top. √ (2)

13. - Study of motion of bodies under the influence of forces. (1)

SECTION B

14. (a) (i) Measurement of length PQ = 3 cm √

$T = \frac{1}{50} = 0.02$ Sec √

$Vpq = \frac{3}{0.02} = 150 \text{ cm s}^{-1}$ √ 4

(ii) $Vxy = \frac{0.5}{0.02}$ √

25 cm s^{-1} √

(iii) $a = \frac{\text{final velocity} - \text{initial velocity}}{\text{time taken}}$ √

$= \frac{25 - 150}{5 \times 0.002}$ √

$= -1250 \text{ cm s}^{-2}$ √ 3

(b) Momentum before collision = Momentum after collision √

$M_1U_1 + M_2U_2 = V(M_1 + M_2)$ √

$5 \times 20 + 8 \times 15 = V(5 + 8)$ √

$220 = 13V$

$V = \frac{220}{13}$

16.92 ms^{-1} √

(4)

15. (a) K.E. = P.E. √

$\frac{1}{2}mV^2 = 00.027$

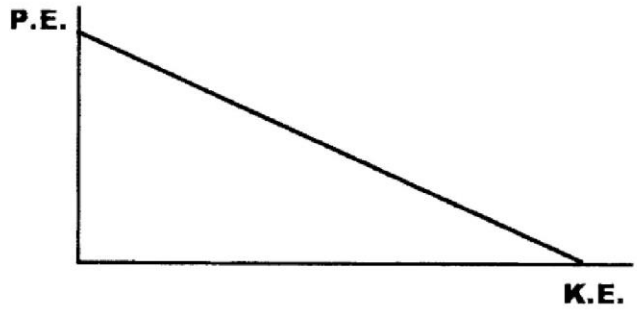
$\frac{1}{2} \times 0.2 \times V^2 = 0.027$

$V^2 = \frac{2 \times 0.27}{0.2}$ 4

$V = 5.196 \, MS^{-1}$

(b) Reduces the effort required to raise the √ load (increases the mechanical advantage.)
(1)

(c)



(d) (i) $\frac{F_1}{A_1} = \frac{F_2}{A_2}$ √

$\frac{90}{\pi.3^2} = \frac{F_2}{\pi.9^2}$ √

$F_2 = \frac{\pi.9^2.90}{\pi.3^2}$ √

= 810 N √

- Straight line with negative gradient √
- axis touched √

3

(ii) Efficiency = $\frac{MA}{V.R} \times 100\%$

$MA = \frac{L}{E} = \frac{810}{90} = 9$ √

V.R = $\frac{81}{9} = 9$ √

Efficiency = $\frac{9}{9} \times 100\% = 100\%$ √ (3)

16. (a) (i) ammeter in series √
voltmeter in parallel √

(ii) - ammeter reading (current) √
- voltmeter reading (voltage) √
- time √

(3)

(iii) Electrical energy supplied = heat gained by solid √

Vit = mc (θ - Θ_1) √

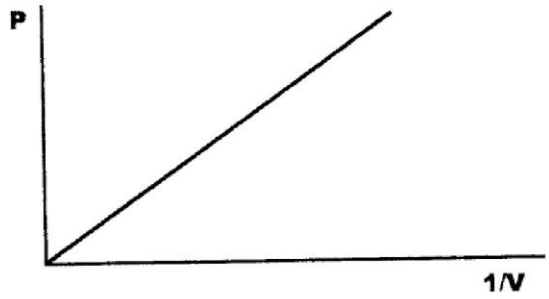
or C = $\frac{Vit}{mc(\theta - \theta_1)}$

(2)

(b) - reduce the diameter of the bore √
- use a thin walled bulb √
- use a liquid with a high expansivity √

3

17. (a)



- a straight line through the origin √ (1)

(b) $\frac{P}{T}$ = constant at constant volume √

- as temperature increases, the kinetic energy of the molecules increases √ causing more collisions hence increased pressure. √ 3

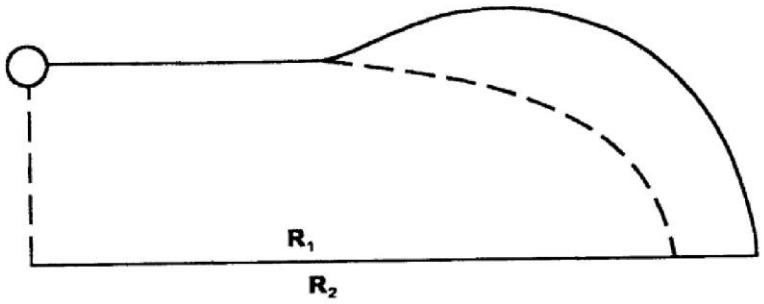
(c) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ √

$\frac{760 \times 20}{298} = \frac{900 \times 15}{T_2}$ √√

$T_2 = \frac{900 \times 15 \times 298}{760 \times 20}$

$= 264.67$ K √ 4

(d) (i)



(ii) Spinning causes high velocity of air above √ the ball hence reduced pressure √ which causes the ball to rise higher. 2

18. (a) (i)
- Tension (T) √
- Weight (Mg) √ 2

(ii) Tension - increases √
Weight - remains constant √ 2

(iii)
- Centrifuges √
- Speed governors √
- Merry-go-rounds

(any other relevant two correct) 2

(b) When heated the density of the water decreases √ hence block sinks further √ as it displaces more volume of water. 2