# END OF YEAR 2025 EXAM (OCTOBER) TIME: 2 HOURS
# FORM 3 PHYSICS PAPER 1
# MARKING SCHEME

1. Light lid builds high pressure in sufuria. The high pressure raises the boiling point of water exposing the potatoes to higher temperature

2. $E = \frac{1}{2} Fe$ √1
   $= \frac{1}{2} \times 2\ 0.015$ √1
   $= 0.015J$√1

3. - Area of base
   - Position of centre of gravity√1

4. The thermometer bulb first receives the heat and expands creating more volume, the mercury then receives the heat and expands causing a rise.

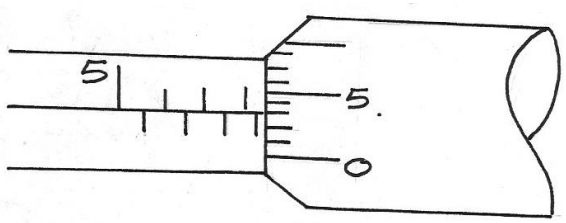
5. $P_1P_1 = P_2\ P_2$
   $P_1 = A + H\ell wg = 100{,}000\ NM^{-2}$
   Volume is directly proportional to $R^3$
   $R_1\ r^3 = P_2\ R^3$
   $R^3 = \frac{P_1 r^3}{P^2} = \frac{105000 \times (1 \times 10^{-3})^3 \sqrt{1}}{100\ 000}$

   $R^3 = 1.05 \times 10^{-9}\ m$

   $R = \sqrt{1.05 \times 10^{-9}} = 1.0164 \times 10^{-3} m$

   $D = 2.0328 \times 10^{-3} m$ 0r 2.0328 mm√1

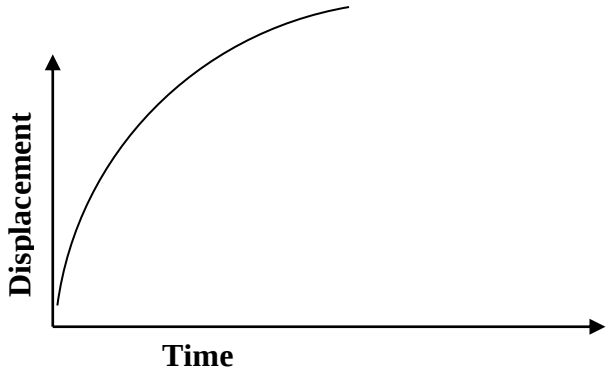
6. Increases in friction lower the efficiency of a machine √1

7. 


8. $A_1V_1 = A_2V_2$ √1
   $A_2 = \frac{A_1 V_1}{V_2}$
   $= \frac{24 \times 3}{9}$√1
   $= 8cm^2$√1

9. Stability increases √1 since centre of gravity is lowered (ice melts to a smaller volume of water)√1

10.




11. (a) The water melts at the top but the ice remains unmelted because water is a poor conductor of heat hence heat is not conducted downwards.

(b) The ice melts; heat is transmitted to it by convection

12. (a) (i) 133-(70 +50)√1
= 133 -120√1
= 13g√1

(ii) $M_wC_w D\theta + M_c C_c D\theta$√1
$= \frac{70}{1000} \times 4200 \times 25 + \frac{50}{1000} \times 900 \times 25$ √1
= 7350 + 4875
= 12225 J√1

(b) (i) Heat given $= ML_v + MCD\theta$√1
$= 13 \times 10^{-3} L_v + 13 \times 10^{-3} \times 4200 \times (100-30)$ √1

(ii) Heat gained by water = Heat given out by steam + calorimeter
$12225 = 13 \times 10^{-3} Lv + 13 \times 10^{-3} \times 4200 \times 70$√1
$12225 = 13 \times 10^{-3} Lv + 3822$
$13 \times 10^{-3} Lv = 8403$√1
$Lv = 646384.6\ kg^{-1}$√1

13. (a) (i) $\frac{16.5}{r} = \frac{44}{16}$√1
$r = \frac{16.5 \times 16}{44}$√1
R = 6cm √1

(b) V.R =R/r √1
$= \frac{16.5}{6}$√1
= 2.75√1

(c) (i) M.A – L/E √1

$= \frac{1200}{300}$ √1

= 4√1

(ii) n = $\frac{M.A}{V.R}$ x 100% √1

= 4/6 x 100%

= 66.67% √1

14. (a) (i) The pressure of a fixed mass of a gas is inversely proportional to it's volume provided the temperature is kept constant √1

(ii) The volume of a fixed mass of a gas is directly proportional to it's absolute temperature at constant pressure √1

(b) (i) Check the student graph

(ii) at $0^oC$ v= 4.7 ± 0.1√1

15. (a) V= u ± at√1

$V^2 = u^2 \pm 2as$√1

$S= ut \pm ½ at^2$

(b) 100km/h = $\frac{100 \times 1000}{3600}$

= 27.78m/s√1

In 0.5 sec. the drive covers 27.78m/s x 0.55 = 13.89m

After applying brake

a = $-4m/s^2$

u= 27.78 m/s

v=0

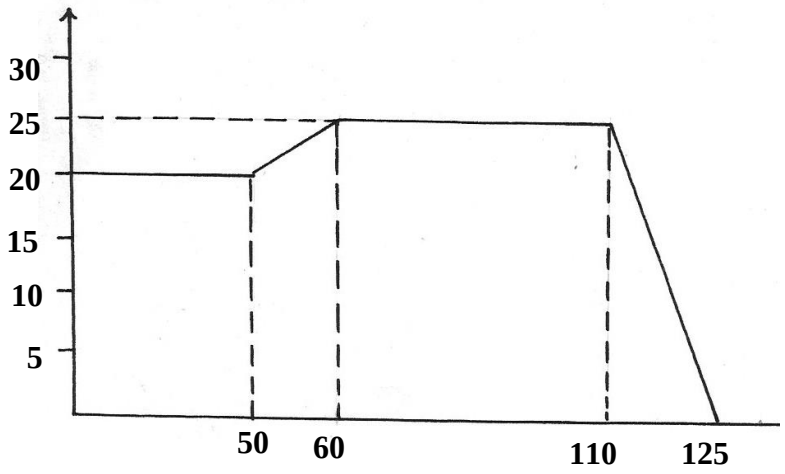
$v^2 = u^2 + 2as$ √1

$-2as = u^2$

$S= \frac{u^2}{2a}$ √1

= $\frac{27.78}{-2(-4)}$ = 96 .47m√1

(c)



(ii) Average velocity = $\frac{\text{total distance covered}}{\text{total time taken}}$

Distance = Area under graph

=(20x 50)+ ½ (20 +25) 10+ (50x25)+ ½ (15x25)

= 1000 + 225 + 1250 + 187.5

= 2662.5 m√1

Total time = 125

Speed = $\frac{2662.5}{125}$√1

= 21.3m/s√1

(iii) a = $\frac{v-u}{t}$ √1

= $\frac{25-20}{10}$

= 0.5m/s√1

16. (a) For a system of colliding bodies the total linear movement remains. Constant provided no external forces act .√1

(b) $m_1 u_1 + m_2 v_2 = m_1 v_1 + m_2 v_2$√1

10000x 10 + 2000 x (-20) = (10000+2000)$v_1$√1

100000-40000=12000$v_1$

$V_1 = \frac{60,000}{12000}$ √1

= 5m/$s^{-1}$√1

(ii) ft =change in movement √1

Ft = mv –mu

F = $\frac{mv - mu}{T}$

= $\frac{(2000 \times 5) - (2000 \times -20)}{2}$√1

= 25000N√1