PHYSICS PAPER 1 MARKING SCHEME JULY/AUG EXAM

1. Accuracy is the minimum reading that can be read from the measuring tape and it is 0.1m

or

10cm (1 mark)

2. 2.3m – 1.2m = 1.1m or 110cm (1 mark)

3. Air is compressible (1 mark)

The transmitted pressure in reduced (1 mark)

4. A surface tension / adhesive force support water column or more capillarity in tube 2 than tube 1(1mark)
Surface tension is the same in both tubes and equal to the weight of water column supported
Narrow tube has longer column to equate weight to wider tube (1 mark)
Volume of water in the tubes is same hence narrower tube higher column (1mark)

5. Glass flask initially expands / Heating increases the volume of the flask(1mark); hence the lignin level drops. Eventually liquid expands more than glass, leading to the level rising.(1mark)

6.

Level in B is higher than in A as indicated (1 mark)

7. Clockwise moment = Anti-clockwise moment (½ mark)

(10 x X) + 100 x (X-50) = 20 x (100-X) (½ mark)

10X + 100X -5000 = 2000 – 20X(1 mark)

130X = 7000 $X = \frac{7000}{130}$ X = 53.85cm from the end with 10 or 46.15cm form end with 20g (1 mark)

8. –The position of the centre of gravity

- the area of the base

-the vertical line passing through the COG (any two)

9. P_2 P_1 = (PA + 5) cmHg
= (PA – 5) cmHg
V_1 = 14cm
V_2 = 16cm
$P_1V_1 = P_2V_2$✓
$(P_A + 5)(14) = (P_A-5)16$✓
$\Rightarrow 14P_A + 70 = 16P_A – 80$
$2P_A = 150$
P_A = 75cmHg

10. $V^2 = u^2 + 2as$

$O2 = 25^2 + 2 \times a \times 20$
$40a = -25^2$
$a = -15.625\ m/s^2$
$F = ma$
$= 800 \times -15.625$ ✓
$= -12500N$
Breaking force 12500N ✓

11. Energy = ½ Fe;

$= ½ \times 20 \times 0.05$

$= 0.5J;$

12. i) energy lost due to friction of the movable parts;

ii) weight of the lifted parts of the machine;

13. to reduce the area of contact increasing the pressure exerted;

14. (a) A floating body displaces its own weight. OR A floating body displaces a fluid whose weight is equal to the weight of the body. (1 mark)

b) Force = Pressure x Area Pressure = ρgh pressure = 1200 x 10 x 0.8 = $9600N/m^2$ (1 mark)

Force = 9600 x 0.08 = 768N(1 mark)

(i) Calculate the upthrust on the block. (3 marks)

Force at the bottom – Force at the top, Force at the bottom (1 mark)= 1200 x 10 x 2 x 0.08 = 1920 N (1 mark) 1920N – 768N = 1152N (1 mark) or Weight of liquid displaced (1 mark)= 1200 x 0.08 x 1.2 x 10 (1 mark)= 1152N (1 mark)

(c) A floating body displaces its own weight (1 mark)

Volume = mass divided by the density

Volume = 0.25 x 13600(1 mark) = $3400m^3$(1 mark)

(d) Relative density = $\frac{\text{apparent loss of weight of a solid in liquid}}{\text{apparent loss of weight of the same solid in water}}$ (1 mark)

$= \frac{0.5N - 0.46N}{0.5N - 0.44N}$ (1 mark) $= \frac{0.04}{0.06} = 0.667$(1 mark)

15.(a) mr = Slope Point (1 mark)

$m = \frac{\text{slope}}{r} = \frac{1.30 - 0.0}{25 - 3} \div 0.3 = 0.04167$ kg to 4 dp Substitution and calculation Answer (1 mark) N/B it entirely depends on the student result from the graph so please you can amend the answers accordingly

C = y- intercept
0.15 (1 mark)

b) A body continues to move in straight line with the same velocity or remain in its state of rest unless acted upon by an external force to otherwise. (1 mark)

(c) So that it may keep the passengers in state of motion with the vehicle and so when it brake the passengers stop with the vehicle. (1 mark)

(d)

D
is
pl
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(½ mark)

(½ mark)

Time

e)

F = f = μR (1mark) F = 0.6 x 1000 = 600N (1 mark)

16.(a)Length of column of dry air (½ mark) Temperature (½ mark)

Length/ height of the mercury thread (½ mark) Volume of air (½ mark)

(iiTemperature is varied and values of Length and Temperature are measured and recorded (½ mark); a graph of Length versus Temperature. is plotted(½ mark). This is a straight line cutting T axis at O (A) (½ mark) (or -273^0C) since tube is uniform Length α Temperature. (½ mark)

(iii) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ (1 mark) $= \frac{1.5 \times 10^5 \times 1.6}{285} = \frac{1.0 \times 10^5 \times V_2}{273}$ (1 mark)

$= V_2 = 23m^3$ (1 mark)

(iv) It increases because liquid pressure reduces as the bubble rises through the liquid thus made the bubble to increase. (1 mark)

(v) This is the temperature of any substance where all internal energy is zero. (1 mark) b) i) Vit

$= ml_f$, $250 \times 4 \times t = 1 \times 3.34 \times 10^5$, (1 mark) $t = \frac{1x3.34x10^5}{1000}$ $t = 334$ seconds

5 minutes 34 seconds(1 mark)

(ii) $Vit = ml_f + m_wc_w\Delta\theta + \frac{1}{2} ml_v$, (½ mark) $250 \times 4 \times t$(½ mark) $= 3.34 \times 10^5 + 2 \times 4200 \times 100 + 1 \times 2.26 \times 10^6$ (1 mark)

$t = \frac{3434,000}{1000}$ $t = 3434$ seconds or 57 minutes and 14 second (1 mark)

17. a) Load is the force exerted by a machine while effort is the force applied to a machine
    (b) Frictional force the machine is to overcome.
    (c) (i) Velocity ratio V.R = 6
    (ii) Distance moved by effort = 2.5 x 6= 15 M
    Work done = Effort x effort distance
    = 500x1.5 = 7500J
    (iii) Useful work done = load x distance
    = 25000x2.5 = 6250J
    (iv) Efficiency = $\frac{\text{Useful work done}}{\text{Total work done}} \times 100$
    $= \frac{6250}{7500} \times 100$
    = 83.33%

18. (a) Inelastic collision
    (b) $m_1u_1 + m_2u_2 = (m_1 + m_2)v$

    $^{22}/_{1000}X450 + {}^{976}/_{1000}X\ 0 = ({}^{976}/_{1000} + {}^{26}/_{1000})v$

    $v = \underline{10.8ms^{-1}}$

    (c) $V^2 = u^2 + 2\ a\ s$

    $0 = 10.8^2 + 2 \times a \times 7.5$

$a = -10.8^2/_{15}$

$a = \underline{-7.7776\ ms^{-1}}$

$F = ma = 1 \times -7.7776\ \underline{ms^{-1}}$
$F = \underline{-7.7776\ N}$

(d) $F = \mu R = \mu mg$
$= m a = \mu \times 1 \times 10$
$\mu = {}^{1 \times 7.776}/_{10}$
$\mu = \underline{0.7776}$