231/1

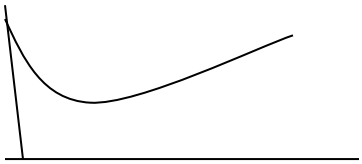
phy PAPER 1

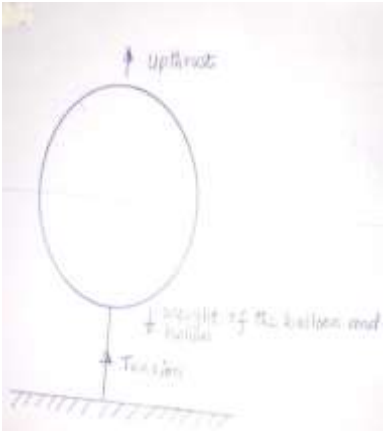
FORM 4

TIME: 2HRS

Marking Scheme

1.	Main scale + vernier Scale + error 2.5 + 0.04 + 0.05 = 2.59	
2.	mass of the liquid = 12 – 6 = 6 g volume of the liquid = 9 cm^3 density of the liquid = 6/9 = 0.6667 g/cm^3	
3.	Gas pressure = atm pressure + hpg $= 0.76 \times 13600 \times 10 + 0.1 \times 1000 \times 10$ $= 103360 + 1000 = 104360 N/M$	
4.	Mass of the object = $\frac{49}{9.8} = 5\ kg$ Acc due to gravity = $\frac{40.5}{5} = \frac{8.1N}{kg}$	
5.	mater is made up of many tiny particle. Small particles of salt fit in between molecules of water when dissolving	
6.	The thermometer in C The rate of conductivity of heat increases with cross-sectional area.	
7.	Boiling water would burst the clinical thermometer	
8.	$0.2 \times 10 = w \times 40$ $w = \frac{0.2 \times 10}{40} = 0.5N$ Total weight = $\frac{2000}{1000} + 0.5$ $2 + 0.5 = 2.5N$ $tension = 2.5\ N$	
9.	the molecules of the air above the car moves at high velocity therefore	

	lowering the pressure above the vehicle	
10.		
11.	to make and break contact of the circuit. The strip bends and straiten when the metal contract or expand at different temperatures. ii) When the switch is closed, current flows through the heater and warm air in the room, thus heating the strip, the strip bends away from the contact . This disconnect the heater, when the strip cools down, it reconnect and the process repeat itself.	
	Section B	
12. (a)	The velocity is the ration of effort distance to that of load distance.	
(b) (i)	$\text{V.R} = \frac{1}{\sin 30} = \frac{1}{0.5}$ $= 2$	
(ii) I)	$effeciency = \frac{M.A}{V.R} \times 100$ $75 = \frac{M.A}{2} \times 100$	
(II)	$M.A = \frac{75\ X\ 2}{100}$ $= 1.5$ $M.A = \frac{L}{E}$ $1.5 = \frac{L}{E}$ $1.5 = \frac{800}{E}$ $E = \frac{800}{1.5} = 533.33n$	
(C) (i)		

(ii)	This due to inertia, the object tends to continue in uniform motion in a straight line $S = \frac{1}{2}gt^2$ $S = 0.2 + 3.2 = 3.4m$ $3.4 = \frac{1}{2} \times 10t^2$ $t^2 = 0.68, t = 0.8246\ seconds$	
13. (a) (b)	Hooke's law states that force applied to an elastic material is directly proportional to the extension provided elastic limit is not exceeded. F = ke 0.2N = K × 0.1 $K = \frac{0.2}{0.1} = \frac{2N}{M}$ $F = 2 \times 0.15$ $F = 0.30\ N$ $= 0.03kg\ or\ 30g$	
14. (a) (b) (c)	When a body is partially or totally immersed in a fluid, it experiences an up thrust equal to weight of the fluid displaced Balloons/ships (explain any one) 	

(ii)	T = upthrust – weight Volume of air displaced = $2000m^3$ Upthrust = 2000 X 1300 X 10 $26 X 10^6$ N Weight of balloon + helium (2000 X 0.18 X 10) + (500 X 10) = 8600 7 = 26 X 106 – 8600 = 25991,400N	
(iii)	F = Ma = resultant force 25991400 = (500 + 360)a A = $30,222.56ms^2$	
(d)	To displace large volumes of the liquid hence provide sufficient upthrust.	
15. (a) (i)	Tension in the spring supporting the object	
(ii)	There is change in the direction of instantaneous velocity at various points along the circular path	
iii)	The object moves tangentially to the circular path at that point where it cuts.	
(c)	Reading of spring balance = centripetal force $\frac{MV^2}{V}$ $81 = \frac{0.5\ X\ V^2}{0.5}$ $V^2 = 81$ $V = 9M^{-S}$	
16. (a)	The pressure of a fixed mass on an ideal gas is directly proportional to the absolute temperature provided the volume remains constant.	
(b)(i)	$\frac{I}{V} = 55$ $v = \frac{1}{55}$ $V = 0.01812cm^3$	
(d)	Increase in temperature causes molecules to move faster causing more number of collisions with the wall of the cylinder, for pressure to	

(c)	remain constant volume must increase	

17 a) the quantity of heat required to raise the temperature of a unit mass of a substance by 1 degree Celsius or by 1 kelvin.

b) i) Q = MLv

0.1 x 2 2600 000 = 226 000 J

ii)Q = MLv + MC x change in temperature = 22600 + 0.1 x 4200 x 50 = 247 000J

iii) 247 000 = m x 4200 x 23

m = 2.557 kg