**PHYSICS P1 MS**

1. (a) 5.50 mm + 0.21 mm = 5.71 mm

5.71 mm – 0.11 mm = 5.60 mm

(b) ϱ = m/v

 v = 4/3 πr3 = 4/3 x 3.142 x 0.283 = 0.09196 cm3

 ϱ = 2.4 g / 0.09196 cm3 = 26.098 g/ cm3

1. In A the C.O.G stays at the same place throughout while in B, C.O.G changes 🗸hence resisting motion. 🗸
2. . Density of gases is lower than in liquids -Intermolecular forces in gasesare weaker than in liquids. - Kinetic energy of gas particles is higher than that of liquids
3. Copper being a better conductor of heat compared to glass, conducts away heat faster than glass
4. The surface tension of water holds the needle making it to float. Detergent lowers the surface tension of water making the needle to break it hence sinking
5. *Correct diagram*
6. .F= Ke

e= f/k

e= 150/300 = 0.5m 🗸

For 3 parallel e = = 0.1667

For 2 springs parallel in e = = 0.25m

Total extension 0.1667 + 0.25 = 0.4167m 🗸

1. Clockwise moment = Anticlockwise moment

0.48 x = 0.34 x 2.0

w =

m =

= 141.67g

1. P1 = (PA + 5) cmHg

P2 = (PA – 5) cmHg

V1 = 14cm

V2 = 16cm

P1V1 = P2V2 🗸

(PA + 5) (14) = (PA-5)16🗸

⇒ 14PA + 70 = 16PA – 80

2PA = 150

PA = 75cmHg

1. As it rises the pressure decreases hence volume increases. 🗸
2. Shinny surface reduce heat loss through radiation since they are emitters of heat. 🗸
3. Smaller area A1 =

= 3.14 x 3 x 3

= 28.26mm2

Wider area A2 =

= 3.14 x 9 x 9

= 254.34m2

A1V1 = A2V2

28.26 x V1 = 254.34 x 2 🗸

V1 =

= 18m/s 🗸

SECTION B

1. (a) The direction of velocity of the moon keeps on changing due to the changes in direction moon as it revolves around the earth.

 (b) (i) = 2 🗸 1mk = 2 x 3.142 x 6 = 37.704 rad/s 🗸 1mk

 (ii) a = = r = 37.7042 x 0.6 = 852.955m/s2 🗸 1mk

 (iii) T = Fc = mrw2 🗸 1mk

 = 0.045 x 0.6 x (37.704)2 = 38.38N 🗸 1mk

 (iv) v = wr = 0.6 x 37.704 🗸 1mk = 22.62m/s

(c) (i) Slope = = 2000N/kg 🗸 1mk

 (ii) 🗸 1mk

 = 0.2 x 2000 = 400N 🗸 1mk

 (iii) Centripetal force 🗸 1mk

1. (a) A floating object displaces its own weight of the fluid in which it is floating

(b) m = ϱv

 V = Ah = 5 x 50 = 250 cm3

 m = 1.4 x 250 = 350 g

(c) apparent weight = weight in air – upthrust

 Weight in air W = mg = 0.35 x 10 = 3.5 N 🗸 1mk

 Upthrust = ϱvg = (250 x 10-6) x 1080 x 10 = 2.7 N 🗸 1mk

 Apparent weight = 3.5 – 2.7 = 0.8 N 🗸 1mk

1. (a) quantity of heat required to raise the temperature of a given mass of a material by one degree or one Kelvin

(b) i. Q = Cϴ

 Q = 40 x 9 = 360 J/kg/K

 ii. Q = mcϴ

 Q = 0.1 x 4200 x 9 = 3780 J/kg/K

 iii. Q = mcϴ

 Q = 0.51 x 66 x c

 Q = 9.9c

 iv. Heat gained = heat lost

 360 + 3780 = 9.9c

 c = 418.181 J/kg/K

1. (a) i. ratio of DE to DL

 ii. *correct diagram*

 iii. - Some energy is used to overcome friction

 - Some energy is used to lift/move parts of the machine

(b) i. VR = R2/r2 = 142/2.82

 VR = 25

 ii. n = (MA/VR) x 100%

 80 = (MA/25) x 100 %

 MA = 20

 iii. MA = L/E

 20 = 1200/E

 E = 60 N

1. (a) i. The rate of change of momentum of a body is directly proportional to the resultant external force producing the change and takes place in the direction of the force

 ii. MV = Ft

 0.25V = 75 x 0.1

 V = 30 m/s

(b) i. m1u1 + m2u2 = (m1 + m2) v

 (0.02 X 400) + 0 = (0.02 + 3.5) v

 v = 2.2727 m/s

 ii. F = ma

 4 = (0.02 + 3.5) a

 a = 11.364 m/s

1. (a) Gas that obey gas law ✓1

 b) 

 = 0.0833pa m3 (*Extract value from graph*)

 c)

  ✓1

  ✓1 V2=4387.097litres ✓1