SET 5

PHYSICS PAPER 1

MARKING SCHEME

1. Main scale reading = 3.5 mm

Thimble scale = 4 x 0.01 = 0.04 mm

Total = 3.5 + 0.04 = 3.54 mm

Add error = 3.54 + 0.01

 = 3.55 mm

1. The cohesive force between mercury molecules is greater than adhesive force between mercury molecules and glass molecules while adhesive force between water and glass molecules is greater than cohesive force between water molecules.
2. Intermolecular forces in gases is greater than that in liquids
3. Wire gauze is a good conductor of heat and therefore conducts heat below to make it start burning
4. Pressure due to mercury = pressure due to paraffin

13600 x $\frac{64}{100}$ x 10 = 800 x h x 10

h = $\frac{136 x 64}{800}$

 = 10.88 m

1. the smoke cells are being knocked by tiny invisible air particles.
2. The candle flame heats the air above it which expands and rises. The rising air hits the vanes to rotate.
3. Shiny outer surface is a poor emitter of radiant heat and therefore helps retain most of the heat
4. To reduce the pressure on the road since the force is distributed to the many wheels
5. B
* The base has been made heavier
1. The rate of change of momentum is directly proportional to the resultant force producing it and acts in the direction of the force.
2. A1V1 = A2V2

3.142 x $\frac{16}{1000}$ x $\frac{6}{1000}$ x 2 = 3.142 x $\frac{9}{1000}$ x $\frac{9}{1000}$ x V2

V2 = $\frac{6 x 6 x 2}{9 x 9}$

 = 0.8889 m/s

1. An exponential curve from the y – axis to x –axis
2. $i) 10^{-6}$ x 0.01 = 500 x 10-4 x h

h = 0.2 x 10-6

= 2.0 x 10-7 m

ii) - oil patch is monolayer/one molecule thick

* Volume of drop equals volume of patch
1. a) Pressure in a liquid is transmitted wholly to all parts of the enclosed liquid.

b) i) P = $\frac{F}{A}$

 = $\frac{20 N}{50 x 10^{-4}}$

 = 2.0 x103 N/m2

 ii) A = $\frac{F}{P}$

 = $\frac{5000}{2000}$

 = 2.5 m2

iii) V.R = $\frac{effort distance}{load distance}$

 = $\frac{area of load piston}{area of effort piston}$

 = $\frac{2.5}{5.0 x 10^{-4}}$

 = 5000

c) Pressure due to mercury = pressure due to paraffin

13600 x $\frac{64}{100}$ x 10 = 800 x h x 10

h = $\frac{136 x 64}{800}$

 = 10.88 m

1. a)

b) i) V.R = $\frac{effort distance}{load distance}$

 = $\frac{2πR}{2πr}$

 = $\frac{R}{r}$

ii) V.R = $\frac{50}{5}$ = 10

 90 = $\frac{M.A}{10}$ x 100

M.A = 9

9 = $\frac{200}{E}$

E = 22.22 N

iii)

iv) energy lost due to friction

 enrgy lost to lifting movable parts

1. a) i) – fluid is non-viscous
* flow is steady
* fluid is incompressible

ii)

b) i)smooth lines taking the same direction after the object as they were before the object

ii) velocity of air above the wing is higher thus the pressure is lower. The higher pressure below pushes the plane upwards.

c) the air from the blower passes the flask with a higher velocity thus the pressure reduces. The higher pressure below pushes the pith ball upwards

 d) i) A1V1 = A2V2

V1 x (2.6 x 10-1)2 x 3.142 = (6.5 x 10-2)2 x 3.142 x 3

V1 = 0.1875 m/s

ii) mass flux = = (6.5 x 10-2)2 x 3 x 1 x 103

 = 1.2675 x 101 kg/m3

1. a = $\frac{v-u}{t}$

v = $\frac{8 x 10^{-2}}{0.02}$ = 4 m/s

u = $\frac{0.02}{0.02}$ = 1 m/s

a = $\frac{4-1}{0.02 x 7}$

a = 21.43 m/s2

b) i) S = ut + ½gt2

S = ½ x 10t2

S = 20t - ½ x10t2

 5t2 = 20t – 5t2

t = 2 s

ii) S = ½ x 10 x 2

 = 10 m

d) momentum before firing = momentum after firing

 0 = (0.012 x 700) x 4v

 V = -2.1 m/s

 Recoil velocity v = 2.1 m/s