SECTION A (25 Marks)

1. Volume of 1 molecule= $\frac{18cm^3}{6x10^{23}}$

$=3x10^{-23}$

Diameter of the molecule = $3\sqrt{3x10^{-23}}$ $=3.107x10^{-8}$

(3 mks)

2. a) Water/or glass are poor conductor of heat (1 mk)

b) Shiny surface reduce heat loss through radiation. (1 mk)

3. Cohesive forces between mercury molecules is greater than adhesives forces between mercury and glass.

Adhesive force between water and glass is greater than cohesive force between water molecules. (2 mks)

5. 5) Gases have large intermolecular distances than liquids hence weaker forces of attraction than in liquids (1 mk)

6. Air molecule are in constant random motion; smoke particles collide with these air molecules hence their random motion (2 mks)

7. Pressure is inversely proportional to the speed OR speed increases as pressure decreases

8. $A_1 V_1 = A_2 V_2$

$$\frac{\frac{22}{7} x6x6xX}{6x6} = \frac{\frac{22}{7} x9x9x2}{\frac{22}{7} 6x6}$$

$x = 4.5m/s$

9.

-Enlarging the base area. (2 marks)

-Lowering the centre of gravity.

10. 0) Surface tension/adhesive forces supports water column or more capillarity in tube 2 than tube 1

- 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
- Volume of water in the tubes is same hence narrower tube higher column

(2 mks)

SECTION B (55 Marks)

13.

a) (i) Work=force x distance;

=2000x10x3 = 60,000

=60,000 (2 mks)

$$\text{Power} = \frac{workdone}{time}$$

$$\frac{60{,}000}{6} = 10{,}000\text{w};$$

$$\frac{10{,}000}{12500} \times 100\% = 80\%$$ (2 marks)

b. Force is centripetal $= \frac{mv^2}{r}$

$$\frac{20x4.24^2}{4} = 89.9\text{v}$$ (3 mks)

14.