Measurement I Questions and Answers - Physics Form 1 Topical Revision

Questions

1. State two factors that should be controlled in manufacturing a cylindrical container of uniform thickness, which should normally be in a standing position.
2. A butcher has a beam balance and masses 0.5 kg and 2 kg. How would he measure 1.5 kg of meat on the balance at once?
3. The number of molecules in $18cm^3$ of a liquid is 6×10^{23}. Assuming that the diameter of the molecules is equivalent to the side of a cube having the same length as the molecule. Determine the diameter of the molecule.
4. Determine the density in kg/m^3 of a solid whose mass is 40g and whose dimensions in cm are 30 x 4 x 3
5. Record as accurately as possible the masses indicated by the pointer in figure A.

Figure A

6. The figure below shows the reading on a burette after 55 drops of a liquid have been used.

If the initial reading was at 0cm mark, determine the volume of one drop. (2 marks)

7. The figure below shows the change in volume of water in a measuring cylinder when an irregular solid is immersed in it.

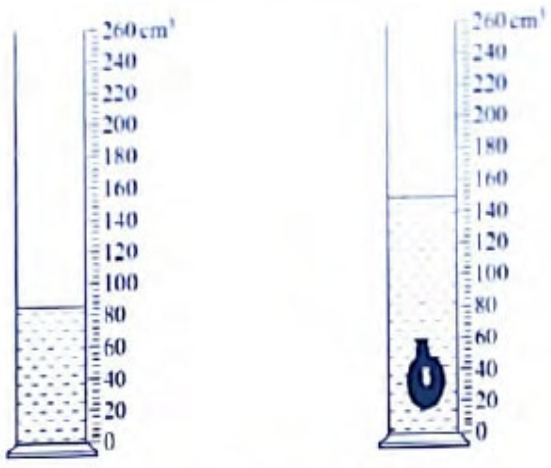
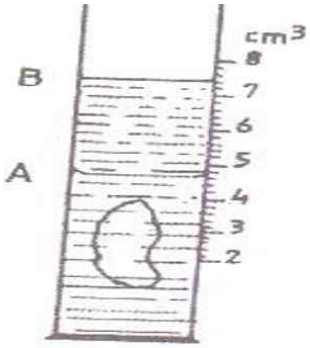


Figure 1

Given that the mass of the solid is 567g, determine the density of the solid in gcm^{-3}. (Give your answer correct to 2 decimal places.

8. A thin wire was wound 30 times closely over a boiling tube. The total length of the windings was found to be 9.3 mm. Calculate the radius of the wire.
9.
    a. Given that a kilogram of copper contains about 1025 atoms and that density of copper is about $9000kg/m^3$. Estimate the diameter of the copper atom?
    b. State the assumption made in (9a) above.
10. A drop of oil of volume 1.0×10^{-3} spreads out on clean water surface to a film of area $10cm^2$. Calculate the thickness of the film.
11. A small drop of oil has a volume of 5×10^{-8} m^3. When it is put on the surface of some clean water, it forms a circular film of 0.1 m^2 in area;
    i. What is the size of a molecule of oil?
    ii. State two assumptions you make in your calculations?
12. The density of concentrated Sulphuric acid is $1.8gcm^{-3}$. Calculate the volume of 3.6kg of the acid.
13. 1600 cm^3 of fresh water of density 1 g/cm^3 are mixed with $1400cm^3$ of seawater of density $1.25g/cm^3$. Determine the density of the mixture.
14. The figure shows a measuring cylinder which contains water initially at level A. A solid mass 11g is immersed in the water, the level rises to B.



Determine the density of the solid. (Give your answer to 1 decimal point)

Answers

1. height, base area
2. Put 0.5kg mass together with meat and balance them against the 2 kg.
3. Volume of one molecule $= \frac{18}{6 \times 10^{23}} = 3 \times 10^{-23}$ cm

   $X^3 = 3 \times 10^{-23}$ cm^3

   $X = 3.11 \times 10^{-8}$ cm^3
4. $d = m/v = 40g / 30 \times 4 \times 3cm^3 = 0.1111$ g/cm^3
5. 1.5 kg
6. Vol. of 1 drop $= (^9/_{55})$ $cm^3 = 0.163cm^3$
7. $D = {}^m/_r = {}^{567}/_{(150 - 80)}$

   $= \frac{576 - 80}{70g/cm^3}$
8. 4.1×10^{-8} M
9.
    a. 4.06×10^{-10}m
    b. That atoms are spherical and that mass is uniformly distributed on the atom and not in the nucleus.
10. 0.001mm