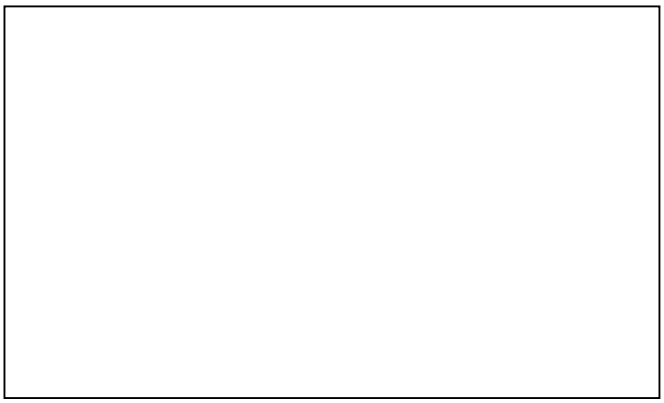
Lesson 11:2

(Please listen to the explanations, fill in the blanks and then complete the on-line quiz on BB7)

3. Describe an experiment to demonstrate Brownian motion.



1. The apparatus consists of a small transparent cell containing s_____particles and is illuminated from side by an intensive l_____.
2. s_____ is transferred by a syringe into the cell with a glass lid covered over it.
3. Microscope is adjusted till b_____ are observed.
4. It is a r_____and c_____motion of _____particles as they are bombarded unevenly by the invisible _____from all directions.

5. Conclusion:
   The _____ move and change in direction randomly & continuously; always collide randomly & elastically with one another.

Observations	Explanations
smaller particles move more randomly while large particles are less agitated	Larger surface area allows _____ collisions by the unseen air molecules but collisions from all directions are likely to _____ out each other, producing a less _____movement on the large particle.
Smoke particles move more randomly when temperature increases	When temperature increases, _____ of the invisible air molecules increases. Air molecules move faster, _____ is more frequent. The resultant force acting on the smoke particles _____ and hence it will move more randomly.

4. The Kinetic theory of Gases

1. There are a very large number of particles (molecules or atoms) involved. This means we can apply statistics to our solutions.
2. The particles are involved in perfectly elastic collisions with their containers and each other. So no Ek is lost.
3. The length of time involved in a collision is negligible compared to the time between collisions (i.e. we can ignore the moments when the potential energy component of the internal energy is not zero).
4. The volume occupied by the particles is negligible compared to the volume of the container. i.e. there are big gaps between particles so they have little or no effect on each other.
5. The particles are involved in random motion i.e. there is no resultant force on them - due to gravity, for example.

Questions

1. What is meant by an ideal gas? [2]
   Gas that obeys ideal gas equation pV=nRT at all values pressure P, volume V and absolute temperature T
   OR
   Gas with no intermolecular force, collide elastically in random motions and negligible volume compared to the volume of container that contains it (state any 3 assumptions from kinetic theory)

2. Why do we learn the kinetic theory of gas?
   These assumptions simplify the derivation of formulae e.g. $p = \frac{1}{3}\frac{Nm}{V}\overline{c^2}$, describe and explain things like pressure and temperature in terms of the movement of individual molecules.

3. Demonstrate an experiment on the movement of gas molecules. [4]
   Guideline to answers
   Brownian motion -1
   Diagram to show set up -2
   Conclusion - 1