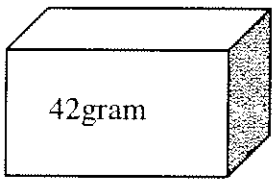
Fluids Review Questions

1. Define these terms
   a. Viscosity
   b. Fluid
   c. Flow rate
   d. viscometer
   e. Buoyancy
   f. Displacement
   g. Aerodynamics
   h. Hydrodynamics
   i. Density
   j. Volume
   k. Drag
   l. streamline
2. What is the difference between pneumatics and hydraulics?
3. Advantages and disadvantages of pneumatics and hydraulics.
4. What is the relationship between viscosity and temperature?
5. What are the 3 parts to the particle theory?
6. Use the particle theory to explain your answer in #4.
7. What does high viscosity mean?
8. What is the density of water?
9. If the density of an object is 1.2g/cm^3 will it sink or float?
10. What is the density of the block of wood in the diagram below?



6cm

4cm

10cm

11. Why are gasses compressible?
12. What units is density measured in?
13. Explain how air is a fluid?
14.
15. How would you figure out the volume of something in an odd shape such as a king's crown?
16. Explain how the overall density of the eyedropper changed in the Cartesian diver. (station #4)
17. What is the difference between laminar and turbulent flow?
18. If the following liquids were poured into a graduated cylinder, what order would they settle?
    a. Gasoline – 0.69
    b. Vegetable oil – 0.92
    c. Glycerol- 1.26
    d. Water- 1.0
    e. Alcohol 0.79
19. Explain how you changed the density of the test tube to make it float and sink.
20. Ask yourself, "Do I understand how everything worked at each station?"
21. Ask yourself, "Do I understand why we got the results we did at each station?"

ANSWERS

1. Definitions
    a. How easily a substance flows, or resistance to flow
    b. A substance that flows
    c. How quickly a fluid flows in a given period of time
    d. An instrument used to measure viscosity
    e. Upward force exhibited by a fluid
    f. The fluid that is pushed aside when a solid object enters the fluid
    g. How air moves around a solid object, or how a solid moves through air
    h. How water moves around a solid object, or how a solid moves through water
    i. The amount of mater in a specific volume
    j. The amount of space that something takes up
    k. The resistance to motion
    l. A shape that reduces drag
2. Pneumatics uses air pressure and hydraulics uses liquid pressure.
3.

Pneumatics	Hydraulics
- uses air	Uses liquids (not just water)
Jumpy and quick	Slow and steady
Need lubricants	No lubricants

4. as temperature increases viscosity decreases.
5.

– everything is made up of particles
– as they are heated they move faster and further apart
–

6. As temperature increases the spaces between the particles increases and allows the particles to slide past each other more easily decreasing the viscosity
7. High viscosity means that it is thick and slow.
8. $1g/cm^3$
9. sink because it is greater than $1g/cm^3$
10. v=LxWxH
    = (6)(4)(10)
    = $240g/cm^3$
    d=m/v
    = $42g/240cm^3$
    =$0.004g/cm^3$

11. There is large spaces between the particles so when the gas gets compressed the spaces between the particles are reduced
12. g/cm^3 or g/ml
13. Air flows and does not form heaps when it is poured.
14. –

15. Pour water into a container and measure the volume of it. Immerse the crown in the water. And measure the water level again. Subtract the differences between the two volumes.
16. The volume of the eyedropper stayed the same but when water entered it, it got more mass and increased the density. There was more mass in the same volume.
17. Laminar flow is streamline and turbulent is rough with lots of drag.
18.

Gasoline – 0.69	top
Alcohol 0.79	
Vegetable oil – 0.92	
Water- 1.0	
Glycerol- 1.26	bottom

19. By removing water we made it lighter and less dense. By adding water we added mass to the same volume (the space that the test tube took up) and made it more dense.