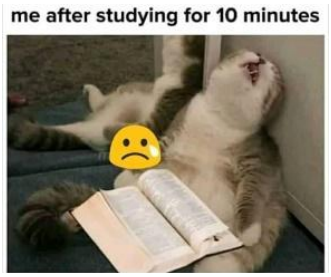


Name: _____

Chapter 3/4 Study Guide

Mix and Flow of Matter

1. **Match the following definitions to their terms. Each term may be used once, more than once or not at all.**

_____ the mass per unit volume

_____ the tendency of an object to float when placed in a fluid

_____ the extent to which a substance can be squeezed

_____ using liquids under pressure to move loads

_____ the ability to dissolve

_____ device that controls the flow of fluids

_____ fluids internal resistance that keeps it fro flowing

_____ measure of the amount of force applied per unit of area

_____ particle that attaches itself to dirt and oil particles, separating it from fabric or other materials

_____ chemicals added to some detergents to increase foaming

_____ device that moves gases through or into something

_____ containers between the inner and outer hulls of a ship

_____ a type of decompression sickness

_____ underwater ship that can go into the deep water

A. ballast tanks
B. bathyscaph
C. buoyancy
D. compressibility
E. density
F. hydraulics
G. phosphates
H. pneumatics
I. pressure
J. pump
K. solubility
L. surfactant
M. the bends
N. valve
O. viscosity

2. **Describe the relationship between each of the following**

a) **viscosity and temperature**_____

_____

b) **density and temperature** _____

_____

c) **density and concentration** _____

_____

d) **density and buoyancy** _____

_____

e) **pressure and water depth** _____

_____

3. DENSITY

a) The units for density are _____ and _____.

b) The formula for calculating density is _____.

c) Calculate the density of a substance that has a mass of 6.34g and a volume of 0.6 mL.

d) How does the Particle Model of Matter explain how density changes with temperature?

_____

_____

_____

4. Buoyancy

a) What is the Plimsoll line on a ship? _____

_____

b) When would you have neutral buoyancy? _____

_____

5. Compressibility

a) Why are gases more compressible than liquids? _____

_____

b) What is incompressibility? _____

_____

6. Pressure

a) The formula for pressure is _____

b) What is Pascal's Law? _____

_____

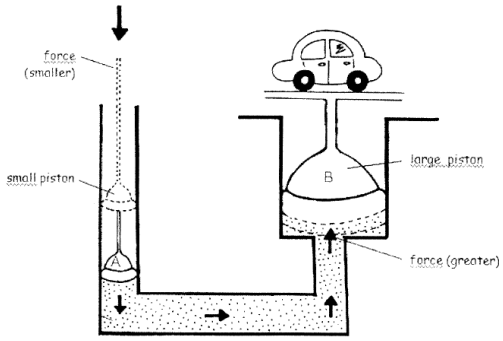
c) Name a mechanical device that uses a hydraulic system. _____

d) Name a mechanical device that uses a pneumatic system. _____

e) Calculate the pressure created if there is a force of 500N on a $2m^2$ piston.

7. Use the information below to answer the questions.

In the hydraulic system below the smaller piston is 0.5 m^2 and the larger one is 15 m^2. The force on the smaller piston is 10 N.



a) What is the pressure placed on the smaller piston?

b) What is the pressure placed on the larger piston?

8. **Fluid Technologies.** Match the devices to their descriptions

_____ this device works by pumping water into, or out of its ballast tanks in order to raise or lower its overall density

_____ this device allows people to dive deep below the surface of oceans and lakes

_____ this device is built to go to extremely deep waters where pressure is too great for humans to dive

_____ this device increases the pressure surrounding a diver's body; used for divers who have "the bends".

_____ this device transports fluids from one place to another using a blade wrapped around a cylinder

A. Archimedes Screw
B. bathyscaph
C. decompression chamber
D. SCUBA
E. submarine

9. Explain how a detergent cleans fabric.

_____

_____

_____