PHY 201 Quiz #9 **Name _____**

Score _____

Instructions:
1. Do all of your work on this sheet.
2. **Show all of your steps** in problems for full credit.
3. **Be clear and neat** in your work. Any illegible work, or scribbling in the margins, will not be graded.
4. Place your **answers in a box**. Do not forget **units**!
5. If you need more space, you may use the back of the page and write **On back** in the problem space.

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1. **Multiple Guess (4 pts)** Find the answer which best fits the question and write it in the space provided.

a. If an object displaces an amount of liquid of greater weight than its own, the object will
a) sink b) float c) remain in equilibrium for any submerged position. _____

b. Bernouli's equation is derived using conservation of
a) mass. b) momentum. c) energy. d) pressure. _____

c. In simple harmonic motion the acceleration is
a) proportional to the displacement. b) never greater than *g*.
c) inversely proportional to the displacement. d) constant
e) greatest when the velocity is greatest. _____

d. If the length of a simple pendulum is doubled, then its period
a) doubles. b) halves. c) is less by a factor of $\sqrt{2}$.
d) is greater by a factor of $\sqrt{2}$. e. remains the same.

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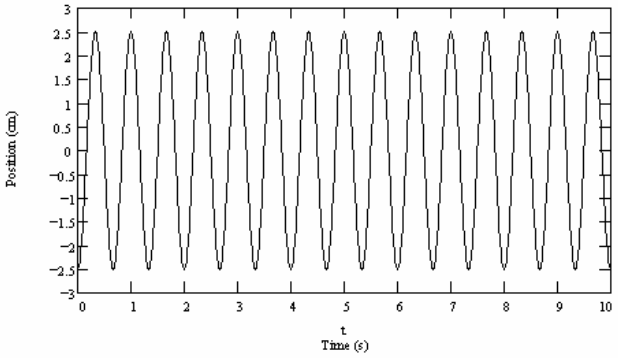
2. **Definition/Principle (4 pts)**

a. Give Bernoulli's equation exactly.

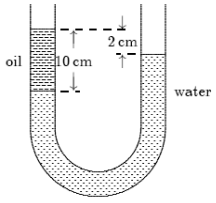
b. For the graph below of position (cm) vs time (s), give the

i. Amplitude. _____

ii. Frequency of oscillation. _____



Bonus: Determine the density of the oil in the U-tube.



3. **Problems (12 pts) Do only 6 problems**

a. What is the pressure on a diver 10 m below the surface of a lake at sea level? (Give the answer in atmospheres.)

b. The dimensions of a wooden raft (density = 150 kg/m^3) are 3:0m × 3:0m × 1:0m. What maximum load can it carry in seawater (density = 1020 kg/m^3)?

c. Water flows through a garden hose at 11 cm/s. The circular hose has a radius of 1.5 cm and the hose nozzle has a radius of 0.25 cm. What is the water speed in the nozzle?

d. A motorist uses a hydraulic lift to raise a 1.5×10^3 kg car. If the area of the input piston is 2.0×10^{-3} m^2 and the output plunger has an area of 5.0×10^{-2} m^2, then what input force in needed to lift the car?

e. An oscillator consists of a block of mass 0.500 kg connected to a spring. When set into oscillation with amplitude of 35.0 cm, it is observed to repeat its motion every 0.500 s. Find the spring's

i) frequency of oscillation. _____

ii) maximum speed. _____

iii) spring constant. _____

f. Water flows through a horizontal tapered pipe. At the wide end its speed is 4.0m/s. The difference in pressure between the ends is 4.5×10^3 Pa. Find the speed of the water at the narrow end.

g. A simple pendulum has a length of one meter. What is its period of oscillation?