

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Physics 6B - MWF - Midterm 1

**Test #: C**

**Name:**

**Perm #:**

**Section (10-11 or 12-1):**

You **MUST** put the **TEST #** in the first answer bubble.

The TA will explain.

**YOU MUST** do this or the test will not be graded.

**WRITE ALL YOUR CALCULATIONS IN THE BLUEBOOK  
PUT YOUR NAME AND THE TEST IN THE BLUEBOOK AND HAND IN**

1. Which of the following are the SI units for specific gravity?
  - A)  $\text{kg/m}^3$
  - B)  $\text{g/cm}^3$
  - C)  $\text{lb/ft}^3$
  - D)  $\text{lb} \cdot \text{s}^2/\text{ft}^4$
  - E) Specific gravity has no units.
  
2. A penny has a mass of 3.0 g, a diameter of 1.9 cm, and a thickness of 0.15 cm. What is the density of the metal of which it is made?
  - A)  $1.8 \text{ g/cm}^3$
  - B)  $3.4 \text{ g/cm}^3$
  - C)  $3.5 \text{ g/cm}^3$
  - D)  $7.1 \text{ g/cm}^3$
  - E)  $4.5 \text{ g/cm}^3$
  
3. What is the gauge pressure at a depth of 6 cm in a glass filled with 4 cm of mercury and 4 cm of water? Water has a density of  $1000 \text{ kg/m}^3$ , and mercury has a density 13.6 times as great.
  - A) 3.1 kPa
  - B) 5.6 kPa
  - C) 5.8 kPa
  - D) 310 kPa
  - E) 560 kPa

4. Your blood pressure is reported as 50 mm of Hg. The density of mercury is  $13.6 \text{ g/cm}^3$ . Your pressure is equivalent to
- A)  $6.7 \times 10^6 \text{ Pa}$ .
  - B) 6.8 Pa.
  - C)  $6.8 \times 10^2 \text{ Pa}$ .
  - D)  $6.7 \times 10^3 \text{ Pa}$ .
  - E)  $3.2 \times 10^2 \text{ Pa}$ .
5. According to Pascal's principle, the pressure at every point in a confined liquid
- A) depends only on the density of the liquid.
  - B) is equal to the weight of the liquid.
  - C) is the same.
  - D) is changed the same amount by an externally applied pressure.
  - E) is equal to the externally applied pressure.
6. You are floating in a boat in a swimming pool. There are some large stones, with a density of  $2.5 \text{ g/cm}^3$ , in the boat. You throw the stones out of the boat and they sink to the bottom of the pool. The water level  $h$ , measured vertically at the end of the pool \_\_\_\_\_ as the stones are thrown out.
- A) decreases
  - B) increases
  - C) There is not enough information to solve the problem.
  - D) stays the same
  - E) None of these is correct.
7. A block of wood of mass 300 g and density  $0.75 \text{ g/cm}^3$  is floating on the surface of a liquid of density  $1.1 \text{ g/cm}^3$ . What mass of lead (density =  $11.3 \text{ g/cm}^3$ ) must be added to the block in order for the combination just to be submerged?
- A) 440 g
  - B) 820 g
  - C) 140 g
  - D) 155 g
  - E) None of the above

8. An air-conditioning system is designed to fill a room of  $10\text{ m} \times 8\text{ m} \times 6\text{ m}$  with fresh air every 20 minutes. If the circular air duct has a diameter of 13 cm, calculate the speed of airflow in the duct.
- A) None of the answers below
  - B) 450 m/s
  - C) 2.4 m/s
  - D) 7.5 m/s
  - E) 1.0 m/s
9. Cities across the United States supply freshwater to the residents at constant pressure by the use of water towers. If the diameter,  $d_2$ , of the pipe coming out of the tower is 25 cm, and the diameter,  $d_1$ , of the pipe at your home is 2.0 cm, what is the ratio of the velocity of the water at  $d_1$  compared with  $d_2$ ? Assume that all the taps are off except yours.
- A) 12.5
  - B) 156
  - C) 0.0064
  - D) 0.08
  - E) 25
10. A particle moving with a simple harmonic motion has its maximum displacement of +18 cm at time  $t = 0$ . The frequency of the motion is  $10\text{ s}^{-1}$ . At a time  $t = 0.65\text{ s}$ , the position of the particle is
- A) +18 cm.
  - B) zero.
  - C) -13 cm.
  - D) -18 cm.
  - E) +7.3 cm.
11. A particle with a mass of 65 g is moving with simple harmonic motion. At time  $t = 0$ , the particle is at its extreme positive displacement of 18.0 cm. The period of the motion is 0.600 s. At time  $t = 1.35\text{ s}$ , the velocity of the particle is
- A) -1.9 m/s.
  - B) zero.
  - C) 0.84 m/s.
  - D) +1.9 m/s.
  - E) -0.84 m/s.

12. A rocket ship is propelled vertically up with an acceleration of  $g$  in a uniform gravitational field. A pendulum of length 1.0 m would have a period of
- A) 0.
  - B) 2.0 s.
  - C) 1.41 s.
  - D) 3.1 s.
  - E) The period is infinite.

## **Answer Key**

1. E
2. D
3. A
4. D
5. D
6. A
7. D
8. D
9. B
10. D
11. A
12. B