

**Physics 10 2nd Midterm (200 pts MAX.) – TEST D**  
**Fall 2004**

1. Elements in a vertical column in the periodic table (a) have the same number of protons (b) form a period (c) have similar chemical properties (d) have similar atomic masses
2. A plasma, the so-called fourth phase of matter, is (a) a combination of a solid and a liquid (b) a gas dissolved in a liquid (c) a combination of the other three phases of matter (d) a gaseous mixture of electrons and ions
3. A group of two or more atoms held together by forces called chemical bonds is a (a) molecule (b) compound (c) period (d) family
4. A material might be made denser by (a) burning (b) stretching (c) compacting (d) heating
5. An automobile “fender bender” is an example of (a) elasticity (b) plasticity (c) Hooke’s law (d) sublimation
6. A solid that consists of covalently bonded atoms such that the solid consists of one large (a) micromolecular (b) macromolecular (c) amorphous (d) ionic
7. The alloy bronze is made up of (a) iron and carbon (b) copper and zinc (c) copper and tin (d) chromium and nickel
8. Pressure applied to an enclosed liquid is (a) transmitted undiminished (b) reduced with distance (c) described by an inverse square law (d) both (a) and (c)
9. A hydraulic jack is an application of (a) Archimedes' principle (b) Bernoulli’s principle (c) Pascal’s principle (d) Newton's principle
10. Liquids (a) have a definite volume (b) have no definite shape (c) are essentially incompressible (d) all of the above
11. Viscosity (a) decreases with increasing temperature (b) affects the pressure-depth relationship (c) is a factor in buoyancy (d) causes surface tension
12. One atmosphere of pressure will support a column of mercury how tall? (a) 30 cm (b) 76 in (c) 0.76 m (d) 760 in
13. The high pressure of the blood in its vessels is called (a) systolic (b) diastolic (c) barometric (d) atmospheric
14. The heart is effectively a (a) force pump (b) lift pump (c) barometer (d) vacuum cleaner
15. If the motions of two oscillators were opposite, we say they are (a) in SHM (b) in phase (c) out of phase (d) both (b) and (c)
16. The energy of a wave (a) is proportional to the square of its amplitude (b) is equal to  $Iat$  (c) falls off as  $1/r^2$  (d) all of the preceding
17. When driven at resonance, a rope vibrates (a) out of phase (b) at only one possible frequency (c) at only the 2<sup>nd</sup> harmonic or 2<sup>nd</sup> overtone (d) at maximum amplitude
18. The speed of sound is (a) independent of temperature (b) generally greater in liquids than in solids (c) on the order of 34 m/s in air (d) none of these
19. The speed of sound in air is 340 m/s. If a plane flies at a speed of 510 m/s, it has a Mach number of (a) 1.5 (b) 2.0 (c) 2.5 (d) 2.7
20. The speed of sound in air on a day when the air temperature is 25 degree C is (a) 331 m/s (b) 346 m/s (c) 352 m/s (d) 360 m/s
21. A Doppler "blue shift" occurs when (a) the source is moving away from a stationary observer (b) an observer is moving away from a stationary source (c) the observer and source are moving towards each other (d) the observer and source are stationary
22. Thermal expansion, or an increase in dimensions with increasing temperature, occurs (a) in most substances (b) in very few substances (c) only in metals (d) both (b) and (c)
23. Which of the following heat units is neither the largest nor the smallest? (a) kilocalorie (b) Btu (c) calorie (d) all are equal
24. The smallest temperature unit is (a) degree Fahrenheit (b) degree Celsius (c) the Kelvin (d) all are the same
25. One Kelvin unit is equivalent to (a) one degree Fahrenheit (b) 1.8 degree Celsius (c) 9/5 degree Fahrenheit (d) one BTU
26. The energy associated with a phase change is called (a) latent heat (b) specific heat (c) radiation (d) none of the preceding

27. Heat transfer takes place because of a difference in (a) potential energy (b) heat content (c) specific heat (d) temperature
28. Ice, water, and steam coexist at the (a) melting point (b) dew point (c) boiling point (d) triple point
29. Monsoons occur as a result of (a) conduction cycles (b) convection cycles (c) radiation cycles (d) thermal insulation
30. Which one of the following did not support atomic theory? (a) Aristotle (b) Democritus (c) Gassendi (d) Dalton
31. What is the density of 1000 kg of water? (a)  $1000 \text{ kg/cm}^3$  (b)  $1000 \text{ kg/m}^3$  (c) 1000 kg (d) 1000 g
32. What is the volume of 1000 kg of water? (a)  $1 \text{ cm}^3$  (b)  $1000 \text{ m}^3$  (c)  $1 \text{ m}^3$  (d)  $1000 \text{ cm}^3$
33. Find the density of a 5-kg solid cylinder. The cylinder is 10 cm tall and has a radius of 3 cm. (a)  $17.7 \text{ kg/m}^3$  (b)  $17.7 \text{ g/cm}^3$  (c)  $17.7 \text{ kg/cm}^3$  (d)  $17.7 \text{ g/cm}$
34. Using a scale, a student determines the mass of a rock to be 0.50 kg and then, using the water-displacement method, finds that the rock has a volume of 0.96 m<sup>3</sup>. What is the density? (a)  $0.52 \text{ kg/m}^3$  (b)  $0.52 \text{ kg/m}^2$  (c) 0.52 kg (d)  $0.50 \text{ kg/m}^3$
35. How much longer would a 1-kg cube of aluminum be than a 1-kg cube of iron? (a) 43% longer (b) 20% longer (c) 86% longer (d) the same
36. Determine the mass of a gold sphere 0.10 m in diameter. (a) 10 kg (b) 15 kg (c) 20 kg (d) 25 kg
37. The depth of water behind the Hoover Dam in Nevada is 220m. What is the water pressure at the base of this dam? (Neglect the pressure due to the atmosphere.) (a) 220 kPa (b) 2160 kPa (c) 220 kg (d) 220 N
38. A barber's chair rests on a hydraulic piston 10 cm in diameter. The input side has a piston with a cross-sectional area of  $10 \text{ cm}^2$ , which is pumped on using a foot pedal. If the chair and the client together have a mass of 160 kg, what force must be applied to the input piston? (a) 200 N (b) 300 N (c) 400 N (d) 500 N
39. About how many kilograms of air occupy a classroom that has a  $200 \text{ m}^2$  floor area and a 4-m-high ceiling? (Assume a chilly 10 degree temperature.) (a) 1000 kg (b) 800 kg (c) 125 kg (d)  $1000 \text{ m}^3$
40. A tank having a volume of  $1.00 \text{ m}^3$  is filled with air at  $0^\circ \text{C}$  to 20.0 times atmospheric pressure. How much volume will that gas occupy at 1.00 atm and room temperature? (a)  $11.5 \text{ m}^3$  (b)  $21.5 \text{ m}^3$  (c)  $31.5 \text{ m}^3$  (d)  $41.5 \text{ m}^3$
41. Radio waves travel at the speed of light  $300,000 \text{ km/s}$ . What is the wavelength of radio waves received at 100.1 MHz on your FM radio dial? (a) 300,000 km (b) 100.1 km (c) 3 m (d) 100.1 m
42. How much more intense than the threshold of hearing is a sound of 30 dB? (a) 10 times (b) 100 times (c) 1000 times (d) 3 times
43. A cello string 0.75 long has a 220-Hz fundamental frequency. Find the wave speed along the vibrating string. (a) 660 m/sec (b) 330 m/sec (c) 330 m (d) 660 m
44. A bat flying in a cave emits a sound and receives its echo 0.1 s late. How far away is the cave wall? (a) 17 m (b) 34 m (c) 51 m (d) 102 m
45. What is the speed of sound at room temperature ( $20^\circ \text{C}$ ) and normal atmospheric pressure? (a) 331 m/sec (b) 331 m (c) 343 m/sec (d) 343 m
46. What would be the final temperature of a mixture of 50 g of  $10^\circ \text{C}$  water and 50 g of  $50^\circ \text{C}$  water? (a)  $10^\circ \text{C}$  (b)  $20^\circ \text{C}$  (c)  $30^\circ \text{C}$  (d)  $40^\circ \text{C}$
47. Convert the temperature  $-30^\circ \text{C}$  to the Fahrenheit scale: (a)  $32^\circ \text{F}$  (b)  $-22^\circ \text{F}$  (c)  $14^\circ \text{C}$  (d)  $10^\circ \text{F}$
48. In a weather forecast, it is reported that the high temperature for the next day is expected to be  $15^\circ \text{C}$ . How should you dress to go to class tomorrow? (What is the Fahrenheit temperature?) (a)  $15^\circ \text{F}$  (b)  $30^\circ \text{F}$  (c)  $59^\circ \text{F}$  (d)  $50^\circ \text{F}$