

# Physics 10 2<sup>nd</sup> Midterm (200 pts Max.) – Test A

## T Th 3:50pm, Spring 2004

Please fill up the bubbles in your Scantron Answer Sheet fully and completely. It is your responsibility to make sure the bubbles are being filled.

1. 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)
2. An object sinks in a liquid when (a) the buoyant force is greater than the object's weight (b) it is completely immersed (c) its density is greater than that of the liquid (d) the weight of the displaced liquid is greater than that of the object
3. In a full, closed container of liquid, the pressure does not depend on (a) the shape of the container (b) the liquid's mass density (c) the acceleration due to gravity (d) the depth
4. A fluid that flows slowly when poured from a container is said to have high (a) buoyancy (b) adhesion (c) viscosity (d) capillary action
5. Viscosity (a) decreases with increasing temperature (b) affects the pressure-depth relationship (c) is a factor in buoyancy (d) causes surface tension
6. 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
7. Hot air rises because it is (a) less dense than the surrounding air (b) contained in a balloon (c) not covered by the gas laws (d) none of the preceding
8. The high pressure of the blood in its vessels is called (a) systolic (b) diastolic (c) barometric (d) atmospheric
9. When the volume of a gas is decreased (a) the pressure must increase (b) the density must increase (c) the temperature must increase (d) Boltzmann's constant changes
10. The "relaxation" pressure of the circulatory system is called (a) barometric pressure (b) diastolic pressure (c) systolic pressure (d) air pressure
11. A solid with its atoms or molecules in an orderly arrangement is called (a) amorphous (b) crystalline (c) polymer (d) plastic
12. Units of density are (a) kg/m (b) g/cm (c) both (a) and (b) (d) neither (a) nor (b)
13. Which type of solid is characterized by high melting points? (a) Ionic (b) Molecular (c) Polymer (d) All of the preceding
14. All materials are to some extent (a) polymers (b) brittle (c) elastic (d) hard
15. An amorphous solid has (a) a definite melting point temperature (b) an orderly array of particles (c) an X-ray diffraction pattern (d) a random particle arrangement
16. Which one of the following did not support atomic theory? (a) Aristotle (b) Democritus (c) Gassendi (d) Dalton
17. The periodic table was formulated by (a) Democritus (b) Dalton (c) Einstein (d) Mendelieve
18. Substances with high melting points generally have (a) ionic bonds (b) covalent bonds (c) polar bonds (d) both (b) and (c)
19. A liquid has (a) definite shape and volume (b) definite volume but no definite shape (c) no definite shape or volume (d) none of the preceding
20. Which of the following is not determined by the number of protons in the nucleus of an atom? (a) atomic number (b) name of type of atom (c) number of electrons in the neutral atom (d) mass number
21. Color vision results from photosensitive cells called (a) pupils (b) rods (c) cones (d) none of these
22. Which of the following is NOT an additive primary color? (a) Red (b) Green (c) Yellow (d) Blue
23. A simple microscope magnifies by (a) internal reflection (b) refractively widening the angle of view (c) reducing the accommodation (d) affecting the rod cells in the retina

24. Light with wavelengths greater than 60nm appears to have the general color of (a) blue (b) green (c) yellow (d) red
25. The film of a camera corresponds to what part of the eye? (a) aperture (b) retina (c) cornea (d) iris
26. Laser light is which of the following (a) coherent (b) stimulated emission (c) nochromatic (d) a, b and c
27. The coherence of laser light is important for (a) no practical applications (b) drilling holes (c) getting laser light to pass through air (d) holography (e) none of above
28. Population inversion has (a) more atoms in lower energy level (b) less atoms in higher energy level (c) more atoms in higher energy level (d) the same number of atoms in all energy level
29. The quantum hypothesis was introduced by (a) Einstein (b) Planck (c) Bohr (d) DeBroglie
30. When a hydrogen electron is excited to a higher energy level, (a) it must be in the ground state (b) a photon of any frequency may be absorbed (c) a photon must be emitted (d) energy is absorbed
31. A 1-liter container completely filled with lead has a mass of 11.3 kg and is submerged in water. What is the buoyant force acting on it? (a) 11.3 N (b) 1000 N (c) 9.8 N (d) 9.8 kg
32. Does Archimedes' principle tell us that if an immersed object displaces liquid weighing 10 N, what is the buoyant force? (a) 10 N (b) 5 N (c) 20 N (d) 30 N
33. 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
34. About how many kilograms of air occupy a classroom that has a 200m<sup>2</sup> floor area and a 4-m-high ceiling? (Assume a chilly 10 degree temperature.) (a) 1000 kg (b) 800 kg (c) 125 kg (d) 1000m<sup>3</sup>
35. What is the volume of 1000 kg of water? (a) 1cm<sup>3</sup> (b) 1000 m<sup>3</sup> (c) 1 m<sup>3</sup> (d) 1000 cm<sup>3</sup>
36. What is the weight of a cubic meter of cork? (For the density of cork, use 400 kg/m<sup>3</sup>.) (a) 220 lb (b) 440 lb (c) 660 lb (d) 880 lb
37. 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 kg/m<sup>3</sup> (b) 17.7 g/cm<sup>3</sup> (c) 17.7 kg/cm<sup>3</sup> (d) 17.7 g/cm
38. A 4-cm diameter ball is located 40 cm from a point source and 80 cm from a wall. What is the size of the shadow on the wall? (a) 4 cm (b) 8 cm (c) 2 cm (d) 10 cm
39. A 6-cm-tall object is placed 60 cm from a concave mirror with a focal length of 20 cm. Find the location and size of the image. (a) 20 cm (b) 60 cm (c) 30 cm (d) 120 cm
40. If light in air is incident at 30°, at what angle is it refracted in water? ( $n_w = 1.3333$ ) (a) 22° (b) 44° (c) 12° (d) 41.8°
41. Light from the bottom of a swimming pool is incident on the surface at an angle of 30 degrees. What is the angle of refraction? ( $n_w = 1.3333$ ) (a) 30° (b) 60° (c) 41.8° (d) 20°
42. The focal length of a converging lens is 30 cm. Locate the image of an object placed 60 cm from the center of this lens. (a) 30 cm (b) 60 cm (c) 90 cm (d) 15 cm
43. How many diopters are there for a converging lens with a focal length of 0.4 cm? (a) 100 diopter (b) 200 diopter (c) 250 diopter (d) 300 diopter
44. The speed of light in diamond is  $1.24 \cdot 10^8$  m/s. What is the index of refraction for diamond? (a) 1.24 (b) 2.4194 (c) 3.0 (d) 1.5
45. If an optical cable has an index of refraction of 1.5, how long will it take a signal to travel between two points on opposite coasts of the United States separated by a distance of 5000 km? (a) 1.5 sec (b) 1.0 sec (c) 0.5 sec (d) 0.25 sec
46. What is the speed of light in glass with an index of refraction of 1.6? (a)  $1.6 \times 10^8$  m/sec (b)  $1.875 \times 10^8$  m/sec (c)  $3.0 \times 10^8$  m/sec (d)  $4.0 \times 10^8$  m/sec

## Physics 10 2<sup>nd</sup> Midterm (200 pts Max.) – Test B

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