

Physics 10 2nd Midterm (200 pts Max.) – Test A
T Th 5:25 pm, 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 has units of (a) N (b) N-m (c) N/m^2 (d) m/N
2. Pascal's principle is applied in (a) a hydraulic press (b) a garage lift (c) hydraulic brake system (d) all of the preceding
3. A hydraulic jack is an application of (a) Archimedes' principle (b) Bernoulli's principle (c) Pascal's principle (d) Newton's principle
4. A mechanical advantage can be obtained by the application of (a) Archimedes' principle (b) Pascal's principle (c) Bernoulli's principle (d) surface tension
5. The pressure at a depth in a liquid depends on the liquid's ____ density. (a) volume (b) shape (c) weight (d) mass
6. When a quantity of dilute gas in a rigid container is heated, it (a) expands (b) has a pressure reduction (c) loses internal energy (d) none of the preceding
7. Atmospheric pressure is measured with (a) a thermometer (b) a barometer (c) a pump (d) none of the preceding
8. The lungs fill with air (a) when the diaphragm relaxes (b) when the lung pressure is less than atmospheric pressure (c) during exhalation (d) when there is systolic pressure
9. A normal systolic blood pressure would be (a) 70 torr (b) 80 torr (c) 125 torr (d) 180 torr
10. The "relaxation" pressure of the circulatory system is called (a) barometric pressure (b) diastolic pressure (c) systolic pressure (d) air pressure
11. The black writing material in a pencil is (a) lead (b) ink (c) carbon (d) none of the preceding
12. A material might be made denser by (a) burning (b) stretching (c) compacting (d) heating
13. Polymers are composed of (a) plastics (b) ionic molecules (c) alloys (d) monomers
14. An automobile "fender bender" is an example of (a) elasticity (b) plasticity (c) Hooke's law (d) sublimation
15. The material with the greatest density is (a) water (b) zinc (c) osmium (d) iron
16. An atomic species is defined by the number of (a) electrons (b) protons (c) neutrons (d) both (b) and (c)
17. 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
18. A polar bond is a type of (a) ionic bond (b) covalent bond (c) bond with symmetrical sharing (d) bond involving magnetic poles
19. 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
20. A substance in which all the atoms have the same number of protons is called a/an (a) compound (b) element (c) molecule (d) none of these
21. A visual defect that occurs naturally with age is (a) astigmatism (b) color blindness (c) nearsightedness (d) not being able to see near objects clearly
22. Which of the following is NOT a subtractive primary color? (a) Cyan (b) Green (c) Magenta (d) Yellow
23. An upright image is seen when looking through (a) a terrestrial telescope (b) an astronomical telescope (c) a Galilean telescope (d) both (a) and (c)
24. The sky appears blue as a result of (a) selective absorption (b) selective reflection (c) selective transmission (d) preferential scattering

25. Rayleigh scattering explains (a) color vision (b) the blueness of the sky (c) additive color production (d) subtractive color production
26. Which of the following is NOT a laser application (a) printing computer output (b) stimulating rainfall from clouds (c) making very precise measurements (d) playing compact disc audio recordings (e) engraving wood
27. Which important laser emits light in the visible range, 400 to 700 nm? (a) argon ion (b) nitrogen (c) carbon dioxide (d) neodymium YAG (e) none of above
28. A carbon dioxide laser has a nominal wavelength of 10.6 micrometers. What is its frequency? (a) 300,000 hertz (b) 2.8×10^{13} hertz (c) 1.06 gigahertz (d) 2.8×10^{10} hertz (e) none of above
29. The photoelectric effect was explained by (a) Planck (b) Einstein (c) Bohr (d) DeBroglie
30. Light amplification in a laser is due to (a) spontaneous emission (b) the photoelectric effect (c) stimulated emission (d) the ultraviolet catastrophe
31. 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
32. 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
33. 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
34. About how many kilograms of air occupy a classroom that has a 200m² floor area and a 4-m-high ceiling? (Assume a chilly 10 degree temperature.) (a) 1000 kg (b) 800 kg (c) 125 kg (d) 1000m³
35. What is the density of 1000 kg of water? (a) 1000 kg/cm³ (b) 1000 kg/m³ (c) 1000 kg (d) 1000 g
36. 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/m³ (b) 17.7 g/cm³ (c) 17.7 kg/cm³ (d) 17.7 g/cm
37. What is the weight of a cubic meter of cork? (For the density of cork, use 400 kg/m³.) (a) 220 lb (b) 440 lb (c) 660 lb (d) 880 lb
38. What is the radius of the spherical surface that would produce a mirror with a focal length of 5 m? (a) 5 m (b) 10 m (c) 15 m (d) 20 m
39. How far does the light travel in one year? This distance is known as a light-year and is commonly used length in astronomy. (a) 9.46×10^8 km (b) 9.46×10^{12} km (c) 9.46×10^{13} km (d) 2.592×10^{10} km
40. Light in air is incident on a surface at an angle of 60°. What is its angle of refraction in glass? ($n_G = 1.5$) (a) 22° (b) 35.264° (c) 40° (d) 60°
41. Locate the image of an arrow placed 60 cm from a diverging lens with a focal length of 30 cm. (a) 20 cm (b) -20 cm (c) 60 cm (d) -60 cm
42. Over what range of positions can an object be located so that the image produced by a converging lens is real and smaller than the object? (a) $d_o > 2f$ (b) $d_o < 2f$ (c) $d_o < f$ (d) $d_o > f$
43. What is the speed of light in glass with an index of refraction of 1.6? (a) 1.6×10^8 m/sec (b) 1.875×10^8 m/sec (c) 3.0×10^8 m/sec (d) 4.0×10^8 m/sec
44. If it takes light 5ns to travel 1 m in an optical cable, what is the index of refraction in the cable? (a) 1.3333 (b) 1.5 (c) 2.0 (d) 3.0
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. 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

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