

Physics 10 2nd Midterm (200 pts MAX.) – TEST C
Spring 2005

1. A solid with its atoms or molecules in an orderly arrangement is called (a) amorphous (b) plastic (c) polymer (d) crystalline
2. Which type of solid is characterized by high melting points? (a) Molecular (b) Ionic (c) Polymer (d) All of the preceding
3. An amorphous solid has (a) a random particle arrangement (b) an orderly array of particles (c) an X-ray diffraction pattern (d) a definite melting point temperature
4. In applying a force to a solid it is common to speak of applying a stress, where stress is defined as the (a) applied force (b) force \times area (c) force/volume (d) force/area
5. The fundamental repeating units in large molecules are called (a) polymers (b) ionics (c) macromolecules (d) monomers
6. Pascal's principle is applied in (a) a hydraulic press (b) a garage lift (c) a hydraulic brake system (d) all of the preceding
7. The buoyant force on a submerged object (a) depends on the weight of the object (b) is greater in a less dense liquid (c) increases with depth in an incompressible liquid (d) depends on volume of liquid displaced
8. A fluid that flows slowly when poured from a container is said to have high (a) buoyancy (b) adhesion (c) viscosity (d) capillary action
9. The crescent-shaped surface of a liquid is called (a) curve (b) semicircle (c) meniscus (d) lens
10. Atmospheric pressure is measured with (a) a thermometer (b) a barometer (c) a pump (d) none of the preceding
11. A normal systolic blood pressure would be (a) 70 torr (b) 80 torr (c) 125 torr (d) 180 torr
12. Boyle's gas law states the relationship between pressure and volume of a gas at (a) constant temperature (b) varying temperature (c) constant heat (d) none of these
13. Waves can propagate through (a) matter (b) space (c) time (d) both (a) and (b)
14. When two waves interfere, which of the following add? (a) Displacement (b) Wavelength (c) Phase (d) None of these
15. The propagation of energy through a medium or space from a disturbance is a(n) (a) oscillation (b) vibration (c) wave (d) harmonic
16. Sonar depends on sound (a) reflection (b) refraction (c) reverberation (d) resonance
17. The bel unit is a comparative measure of sound (a) frequency (b) quality (c) intensity level (d) none of these
18. A person hears thunder 4 seconds after seeing a lightning flash. The lightning was approximately how far away? (a) 1.3 km (b) 1.5 km (c) 2.6 km (d) 3.0 km
19. For the Doppler effect to occur, there must be (a) a moving source of sound (b) a moving listener (c) relative motion between a source of sound and listener (d) all of these
20. When a bimetallic strip is heated, it bends toward the metal with the (a) greater thermal expansion (b) smaller thermal expansion (c) greater specific heat (d) lower specific heat
21. A Btu is equivalent to about how many food Calories? (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{6}$ (d) $\frac{1}{8}$
22. The human temperature sense is associated with (a) sight (b) hearing (c) smell (d) touch
23. Absolute zero is (a) $-273\text{ }^{\circ}\text{C}$ (b) -273 K (c) 273 K (d) 273°F
24. A direct change from the solid phase to the gaseous phase is called (a) condensation (b) evaporation (c) sublimation (d) boiling
25. Radiation is a method of heat transfer by means of (a) convection currents (b) molecular interaction (c) electromagnetic waves (d) all of these
26. Monsoons occur as a result of (a) conduction cycles (b) convection cycles (c) radiation cycles (d) thermal insulation
27. What is the weight of a cubic meter of cork? (For the density of cork, use 400 kg/m^3) (a) 220 lb (b) 440 lb (c) 660 lb (d) 880 lb
28. 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

29. A large storage tank with a height of 10.0 m is used to store gasoline. What is the pressure on the bottom of the tank when it is full? ($P_{\text{gas}} = 680 \text{ kg/m}^3$) (a) 66600 PA (b) 66600 kg (c) 68000 kg/m² (d) 68000 m²
30. 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
31. Gusts of wind make the Sears Building in Chicago sway back and forth at a vibration frequency of about 0.1 Hz. What is its period vibration? (a) 0.1 sec (b) 5 sec (c) 10 sec (d) 20 sec
32. What is the approximate distance of a thunderstorm when you note a 3-s delay between the flash of lightning and the sound of thunder? (speed of sound in air = 340 m/s at 15°C) (a) 340 m/sec (b) 680 m/sec (c) 1020 m (d) 680 m
33. What is the wavelength of a 340-Hz tone in air? (a) 340 m (b) 1 m (c) 10 m (d) 100 m
34. What would be the final temperature of a mixture of 50 g of 10° C water and 50 g of 50° C water? (a) 10°C (b) 20°C (c) 30°C (d) 40°C
35. Suppose a bar 1 m long expands 0.8 cm when heated. By how much will a bar 100 m long of the same material expand when similarly heated? (a) 100.5 m (b) 100.8 m (c) 100 m (d) 10 m
36. Convert the temperature -30°C to the Fahrenheit scale: (a) 32°F (b) -22°F (c) 14°C (d) 10°F
37. A child has a temperature of 40° C. Is this serious? Explain in terms of Fahrenheit temperature. (a) 40°F (b) 60°F (c) 80°F (d) 104°F
38. A container holding 0.250 kg of water at 20.0 °C is placed in the freezer compartment of a refrigerator. How much energy must be removed from the water to turn it into ice at 0 °C? (a) -100 J (b) -1,000 J (c) -10,000 J (d) -100,000 J
39. A quantity of what looks like lead shot, having a mass of 100 g, is poured into a test tube. The tube is then partially submerged in a beaker of boiling water and kept there until the shot reaches 100.0 °C. The hot shot, as it were, is then quickly transferred to a vessel containing 100 g of water at 20.00 °C. The contents are gently stirred until they come to an equilibrium temperature of 22.41 °C. What is the specific heat of the shot? The effect of the vessel is negligible. (a) 0.130 J/kg·K (b) 1.30 J/kg·K (c) 13.0 J/kg·K (d) 130 J/kg·K
40. The black writing material in a pencil is (a) lead (b) ink (c) carbon (d) none of the preceding
41. Polymers are composed of (a) plastics (b) ionic molecules (c) alloys (d) monomers
42. The material with the greatest density is (a) water (b) zinc (c) osmium (d) iron
43. The geometric pattern or arrangement of particles in a crystalline solid is known as the (a) ionic structure (b) lattice (c) macromolecular pattern (d) none of these
44. Pressure has units of (a) N (b) N·m (c) N/m² (d) m/N
45. The buoyant force in a liquid (a) increases with depth (b) acts on all surfaces of an immersed object (c) is independent of the liquid's density (d) none of the preceding
46. A fixed quantity of gas is held in a cylinder capped at one end by a movable piston. The pressure of the gas is initially 1 atmosphere (101 kPA) and volume is initially 0.3 m³. What is the final volume of the gas if the pressure of the gas is increased to 3 atmospheres at constant temperature? (a) 0.05m³ (b) 0.1m³ (c) 0.2m³ (d) 0.3m³
47. A heat engine takes in 1200 J of heat from the high-temperature heat source in each cycle and does 400 J of work in each cycle. How much heat is released into the environment in each cycle? (a) 1200 J (b) 800 J (c) 400 J (d) 1600 J
48. A hot plate is used to transfer 400 Cal (1 Cal = 4.2 J) of heat to a beaker containing ice and water. 500 J of work are also done on the contents of the beaker by stirring. How much ice melts in the process? (a) 2.2 grams (b) 4.4 grams (c) 6.5 grams (d) 8.8 grams
49. If the specific heat capacity of ice is 0.5 cal/g·C°, how much heat would have to be added to 200 g of ice, initially at a temperature of -10 C°, to raise the ice to the melting point? (a) 200 cal (b) 400 cal (c) 800 cal (d) 1000 cal
50. Suppose that a merry-go-around is accelerated at a constant rate of 0.005 rev/sec², starting from rest, how many revolutions do the merry-go-around make at the end of 1 minute? (a) 9 rev (b) 6 rev (c) 3 rev (d) 1 rev