

Physics 10 Midterm (150 PTS MAX) - #B

1:00PM, Fall 2003

1. When Newton's second law is used to express weight, the acceleration is then (a) zero (b) due to gravity (c) directly proportional to the mass (d) none of the preceding.
2. An automobile is traveling due east on an interstate highway at a constant velocity of 65 miles per hour. The **unbalanced** force acting on the car with respect to the highway is (a) Toward the east (b) Toward the west (c) Directed vertically (d) Zero.
3. The gravitational potential energy (a) is independent of path (b) is independent of height (c) is always positive (d) decreases with increasing height.
4. With constant mass, the conservation of momentum is essentially stated in which of Newton's Law? (a) First (b) Second (c) Third (d) Gravitation
5. Automobile air bags protect passengers during collisions by (a) increasing both the impulse time and impulse force (b) increasing the impulse time and decreasing the impulse force (c) reducing the impulse (d) decreasing both the impulse time and force.
6. Uniform circular motion requires (a) centripetal acceleration (b) centripetal force (c) tangential velocity (d) all of the preceding.
7. A vertically projected object (a) has zero acceleration at maximum height (b) has a constant velocity (c) has a greater acceleration than a horizontally projected object (d) returns to its starting point with the same initial speed.
8. Compared with its value on the Earth's surface, the acceleration due to gravity at an altitude of one Earth radius is (a) the same (b) two times greater (c) one-half as great (d) one-fourth as great.
9. A particle (a) has no physical dimensions (b) can be accurately located (c) does not have rotation (d) all of the preceding apply.
10. An object in stable equilibrium will remain so as long as its center of gravity is (a) outside the object (b) inside and above its original base of support (c) at the same location as its center of mass (d) none of the preceding.
11. What is the average speed of a cheetah that sprints 100 meters in 4 seconds? (a) 100m (b) 100m/s (c) 25m/s (d) 4m
12. A particular car can go from rest to 90km/hr in 10 seconds. What is its acceleration? (a) 9m/s^2 (b) 9m/s (c) 2.5m/s^2 (d) 2.5m/s
13. What is the acceleration of a 40 kg block of cement when pulled sideways with a net force of 200N? (a) 40 kg (b) 40 m/sec^2 (c) 5 m/sec^2 (d) 5 m/sec
14. A firefighter of a mass 80 kg slides down a vertical pole with an acceleration of 4 m/sec^2 . What is the friction force that acts on the firefighter? (a) 80 N (b) 320 N (c) 460 N (d) 784 N
15. A cyclist leaves Las Vegas riding at the rate of 18 mph. One hour later a car leaves Las Vegas going 45 mph in the same direction. How long will it take the car to over take the cyclist? (a) 1hr (b) 2 hr (c) 0.667 hr (d) 1.5 hr
16. What is the impulse needed to stop a 10 kg bowling ball moving at 6 m/sec? (a) 10 N (b) 6 kg (c) 10 kg m/sec (d) 60 kg m/sec
17. A car with a mass of 1000 kg moves at 20 m/sec. What braking force is needed to bring the car to a halt in 10 seconds? (a) 1000 N (b) 2000 N (c) 500 N (d) 1500 N
18. A car moving at 50 km/h skid 15 m with locked brakes. How far will the car skid with locked brakes at 100 km/h? (a) 135 m (b) 50 m (c) 60 m (d) 100 m
19. What is the tangential speed of a passenger on a Ferris wheel that has a radius of 10 m and rotates once in 10 seconds? (a) 3.1416 m (b) 6.283 m (c) 6.283 m/sec (d) 3.1416 m/sec
20. A ball is thrown horizontally from a cliff at a speed of 10 m/s. What is its speed 1 second later? (a) 10 m/sec (b) 20 m/sec (c) 14 m/sec (d) 14 m
21. When an air-filled balloon is put in a freezer and cooled, the balloon has a) a pressure reduction b) a pressure increase c) a volume decrease d) both a) and c)

22. The “relaxation” pressure of the circulatory system is called a) diastolic pressure b) barometric pressure c) systolic pressure d) air pressure
23. 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
24. A disturbance with particle oscillations parallel to the direction the wave propagation is called a) longitudinal wave b) transverse wave c) water wave d) light wave
25. Standing waves a) have no motion at all b) are always out of phase c) have zero amplitude at the nodal positions d) can have only one characteristic frequency
26. If the motion of two oscillators of the same frequency are always in the same direction, we say they are a) in resonance b) out of phase c) destructive d) in phase
27. Sonar depends on sound a) refraction b) reflection c) reverberation d) resonance
28. The bel unit is a comparative measure of sound a) frequency b) quality c) intensity level d) none of these
29. The Doppler effect a) occurs for a person riding in a car with the car horn blowing b) is caused by resonance c) is used in radar d) gives rise to beats
30. The periodic table was formulated by a) Dalton b) Democritus c) Mendelievee d) Einstein.
31. Elements in a vertical column in the periodic table a) form a period b) have similar chemical properties c) have the same number of protons d) have similar atomic masses
32. 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.
33. An amorphous solid has a) an orderly array of particles b) a definite melting point c) a random particle arrangement d) an X-ray diffraction pattern.
34. 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 x area c) force/area d) force/volume
35. The fundamental repeating units in large molecules are called a) monomers b) macromolecules c) polymers d) ionics.
36. Pressure may be increased by a) decreasing the area of contact b) decreasing the applied force c) increasing the force and area by the same factor d) none of the preceding.
37. An object sinks in a liquid when a) it is completely immersed b) its density is greater than that of the liquid c) the buoyant force is greater than the object’s weight d) the weight of the displaced liquid is greater than that of the object.
38. A fluid that flows slowly when poured from a container is said to have high a) buoyancy b) viscosity c) adhesion d) capillary action.
39. What is the volume of 1000 kg of water? (a) 1 cm³ (b) 1 m³ (c) 1000 cm³ (d) 10 m³
40. What is the weight in lb of a two cubic meter of cork (For the density of cork, use 400 kg/m³). (a) 440 lb (b) 880 lb (c) 1760 lb (d) 400 lb
41. 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) 11.3 kg (c) 9.8 N (d) 9.8 kg
42. When a 2.0 kg object is suspended in water, it “masses” 1.5 kg. What is the density of the object? (a) 2.0 kg/m³ (b) 1.5 kg/m³ (c) 4000 kg/m³ (d) 2000 kg/m³
43. What is the frequency in vibrations per second of a 60-Hz wave? What is its period? (a) 0.0166 sec (b) 0.01 sec (c) 0.0166 cycle/sec (d) 0.166 sec
44. If a train of freight cars, each 10m long, rolls by you at the rate of three cars each second. What is the speed of the train? (a) 10 m/sec (b) 20 m/sec (c) 30 m/sec (d) 40 m/sec
45. A skipper on a boat notices wave crests passing his anchor chain every 5 s. He estimates the distance between wave crests to be 15 m. He also correctly estimates the speed of the waves. What is this speed? (a) 15 m (b) 3 m/sec (c) 15 m/sec (d) 5 m/sec
46. What is the approximate distance of a thunderstorm when you note a 4-s delay between the flash of lightning and the sound of thunder? (a) 340 m (b) 680 m (c) 1020 m (d) 1340 m
47. How much more intense than the threshold of hearing is a sound of 30 dB? (a) 1 (b) 10 (c) 100 (d) 1000