

Physics 10 Midterm (150 PTS MAX) - #A

1:00PM, Fall 2003

1. Suppose your physics book is lying on a table. How many forces are acting on it? (Neglect air pressure and extraterrestrial forces) (a) One (b) Two (c) Five (d) Six.
2. The unit of energy in the SI is the (a) watt (b) Newton (c) joule (d) horsepower.
3. The form of energy in which mass conversion is significant is (a) electrical (b) gravitational (c) nuclear (d) chemical.
4. In order to reduce the “string” in catching a hard ball, one usually (a) increases the contact time (b) increases the contact force (c) increases the impulse (d) increases the change in momentum.
5. For a system of constant mass, the conservation of momentum is essentially stated in (a) Newton’s first law (b) Newton’s second law (c) Newton’s third law (d) Newton’s law of gravitation.
6. An object in uniform circular motion has constant (a) speed (b) velocity (c) tangential acceleration (d) momentum.
7. During a full-moon spring tide, the gravitational attractions of the Sun and moon on the Earth (a) cancel each other (b) produce higher low tides (c) are generally in opposite directions (d) produce very high tides because the moon is closer to the Sun.
8. A location in a gravitational field is (a) the gravitational force per unit mass at that point (b) the acceleration due to gravity at that point (c) on a line of force (d) all of the preceding.
9. The moment of inertia is a measure of (a) rotational speed (b) rotational inertia (c) angular acceleration (d) torque.
10. A circus stilt walker stand balanced on one stilt. He is in (a) unstable equilibrium (b) stable equilibrium (c) neutral equilibrium (d) universal equilibrium.
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 it’s 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. The periodic table was formulated by a) Dalton b) Democritus c) Mendelievee d) Einstein.
22. Elements in a vertical column I the periodic table a) form a period b) have similar chemical properties c) have the same number of protons d) have similar atomic masses

23. 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.
24. An amorphous solid has a) an orderly array of particles b) a definite melting point temperature c) a random particle arrangement d) an X-ray diffraction pattern.
25. 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
26. The fundamental repeating units in large molecules are called a) monomers b) macromolecules c) polymers d) ionics.
27. 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.
28. 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.
29. A fluid that flows slowly when poured from a container is said to have high a) buoyancy b) viscosity c) adhesion d) capillary action.
30. 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)
31. The "relaxation" pressure of the circulatory system is called a) diastolic pressure b) barometric pressure c) systolic pressure d) air pressure
32. 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
33. A disturbance with particle oscillations parallel to the direction the wave propagation is called a) a longitudinal wave b) transverse wave c) water wave d) light wave
34. 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
35. 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
36. Sonar depends on sound a) refraction b) reflection c) reverberation d) resonance
37. The bel unit is a comparative measure of sound a) frequency b) quality c) intensity level d) none of these
38. 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
39. 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
40. 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
41. 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
42. 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
43. How much more intense than the threshold of hearing is a sound of 30 dB? (a) 1 (b) 10 (c) 100 (d) 1000
44. What is the volume of 1000 kg of water? (a) 1 cm³ (b) 1 m³ (c) 1000 cm³ (d) 10 m³
45. 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
46. 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
47. 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