

Physics 10 Midterm (150 PTS MAX) - #A

5:35PM, Fall 2003

1. For two objects of different mass in free fall (a) The accelerations are different (b) The more massive object will reach the ground first if released simultaneously (c) Air resistance is a consideration (d) The acting forces are different.
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 height (b) is independent of path (c) is always positive (d) decreases with increasing height.
4. In order to reduce the “string” in catching a hard ball, one usually (a) increases the change in momentum (b) increases the contact time. (c) increases the impulse (d) increases the contact force.
5. When objects stick together after collision (a) the momentum is not conserved (b) the momentum is zero (c) the collision is completely inelastic (d) the collision is elastic.
6. The braking action of a large jet plane after landing is chiefly due to (a) mechanical brakes (b) tire friction (c) resistance on wing foils (d) reverse thrust.
7. Ocean tides occur (a) once daily (b) exactly 24 hours apart (c) because of lunar gravitation (d) only in the Southern Hemisphere.
8. The theory of gravity as being a warping of space-time was proposed by (a) Einstein (b) Halley (c) Newton (d) Lowell.
9. The farther the mass of a body is from the axis of rotation, (a) the smaller its rotational speed (b) the larger the number of radians in a circle (c) the larger the moment of inertia (d) none of the preceding.
10. A circus stilt walker stand balanced on one stilt. He is in (a) stable equilibrium (b) unstable equilibrium (c) neutral equilibrium (d) universal equilibrium.
11. What is the average speed of a cheetah that sprint's 100m in 4 seconds? (a) 100m/sec (b) 50m/sec (c) 25 m/sec (d) 25m
12. If a car moves with an average speed of 60km/hr for an hour, it will travel a distance of 60km. How far will it travel if it moved at this rate for 4hrs? (a) 60km (b) 60km/hr (c) 240 km/hr (d) 240 km
13. A particular car can go from rest to 90km/hr in 10 sec. What is its acceleration? (a) 9km/hr hr (b) 205m/hr hr (c) 9km/sec sec (d) 2.5m/sec sec
14. What is the acceleration of a 40-kg. block of cement when pulled side ways with a net force of 200 N? (a) 1 m/s^2 (b) 2 m/s^2 (c) 4 m/s^2 (d) 5 m/s^2
15. How much acceleration does a 747 Jumbo Jet of a mass of 30,000 kg experience in take off when the thrust for each of the four engines is 30,000 N? (a) 1 m/s^2 (b) 2 m/s^2 (c) 4 m/s^2 (d) 4 m/s^2
16. What is the impulse needed to stop a 10-kg bowling ball moving at 6m/s? (a) 10 kg m/sec (b) 20 kg m/sec (c) 60 kg m/sec (d) 30 kg m/sec
17. A car with a mass of 100kg moves at 20m/sec. What braking force is needed to bring the car to a halt in 10sec? (a) -2000 N (b) 1000 kg (c) 2000 kg (d) 2000 N
18. How much work is done on it when you lift a 75N bowling ball 1m? (a) 75 N (b) 75 Joules (c) 75 watts (d) 75 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. The value of g at the Earth's surface is about 9.8 m/s^2 . What is the value of g at a distance from the Earth's center that is four times the Earth's radius? (a) 0.625 m/s^2 (b) 0.625 m/s (c) 9.8 m/s^2 (d) 9.8 m/s
21. Substances with high melting points generally have a) covalent b) polar bonds c) ionic bonds d) both (b) and (c)
22. 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

23. Which of the following is not determined by the number of protons in the nucleus of an atom? a) mass number b) atomic number c) number of electrons in the neutral atom d) name or type of atom
24. Plastic deformation occurs a) when the elastic limit is reached b) chiefly in ceramic materials c) only for metals d) only in plastics
25. A solid that consists of covalently bonded atoms such that the solid consists of one large a) micromolecular b) macromolecular c) amorphous d) ionic
26. The alloy bronze is made up of a) iron and carbon b) copper and zinc c) chromium and nickel d) copper and tin
27. 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)
28. The buoyant force in a liquid a) increases with depth b) is independent of the liquid's density c) acts on all surfaces of an immersed object d) none of the preceding
29. In a full, closed container of a liquid, the pressure does not depend on a) the depth b) the liquid's mass density c) the acceleration due to gravity d) the shape of the container
30. 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
31. When the volume of a gas is decreased a) the density must increase b) the pressure must increase c) the temperature must increase d) Boltzmann's constant changes
32. For a balloon to rise, the gas inside must have _____ than the air outside. a) fewer molecules per unit volume b) less density c) less humidity d) less internal energy
33. The period of an SHM oscillation a) increases with amplitude b) is equal to $1/f$ c) has units of hertz d) is always in phase
34. If the combined waveforms of two identical interfering waves is smaller than that of either wave, the interference is said to be a) destructive b) constructive c) standing d) both (a) and (c)
35. The propagation of energy through a medium or space from a disturbance is a(n) a) oscillation b) vibration c) wave d) harmonic
36. Concert halls experience sound problems because of a) multiple reflections b) refraction c) reverberant sound d) both (a) and (c)
37. If a sound source and an observer both move with the same constant velocity, the frequency heard by the observer relative to the source frequency would be a) the same b) higher c) lower
38. 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
39. Gusts of wind make the Sears Building in Chicago sway back and forth at a vibration frequency of about .01 Hz. What is its period vibration? (a) 1 sec (b) 10 sec (c) 0.1 sec (d) 10 cycle/sec
40. If a water wave oscillates up and down three times each second and the distance between wave crests is 2m, what is its wave speed? (a) 2 m/sec (b) 6 m/sec (c) 4 m/sec (d) 1 m/sec
41. Radio waves travel at the speed of light – 300,000 km/s. What is the wavelength of radio waves received at 100.1 MHz on your FM radio dial? (a) 3 m (b) 100 m (c) 3 km (d) 100 km
42. What beat frequencies are possible with tuning forks of frequencies 256 Hz and 261 Hz? (a) 2 Hz (b) 3 Hz (c) 4 Hz (d) 5 Hz
43. What is the density of 1000 kg of water? (a) 1000 kg/cm^3 (b) 1 kg/m^3 (c) 1 g/cm^3 (d) 1 kg
44. Find the density of a 10-kg solid cylinder. The cylinder is 10 cm tall and has a radius of 3 cm. (a) 7.7 g/cm^3 (b) 17.7 g/cm^3 (c) 35.4 g/cm^3 (d) 35.4 g
45. Does Archimedes' principle tell us that if an immersed object displaces liquid weighing 10 N, what is the buoyant force? (a) 1 N (b) 2 N (c) 5 N (d) 10 N
46. The depth of water behind the Hoover Dam in Nevada is 220 m. What is the water pressure at the base of this dam? (Neglect the pressure due to the atmosphere.) (a) 200 kpa (b) 9800 kpa (c) 2160 kpa (d) 216 kpa
47. About how many kilograms of air occupy a classroom that has a 200-m^2 floor area and a 4-m-high ceiling? (density of air is 1.25 kg/m^3 at 10°C) (a) 200 kg (b) 800 kg (c) 1000 kg (d) 2000 kg