

Physics 10 1st Midterm (200 pts MAX.) – TEST C Spring 2005

1. A particular car can go from rest to 90 km/hr in 10 seconds. What is its acceleration? (a) 0.5 m/sec (b) 1.0 m/sec (c) 2.5 m/sec (d) 2.5 m
2. Suppose you drove a distance of 100 km in 2 hours. What is your speed? (a) 100 km/hr (b) 50 km/hr (c) 200 km/hr (d) 150 km/hr
3. How much acceleration does a 747 jumbo jet of mass 30,000 kg experience in take off when the thrust for each of the four engines is 30,000N? (a) 4 m/s^2 (b) m/s (c) 4 m (d) 4 N
4. The motor boat can go 18 mph in still water. If a trip down stream takes 4 hours and the return trip takes 5 hours, find the speed of the current? (a) 18 mph (b) 6 mph (c) 2 mph (d) 1 mph
5. A typical dragon can lift 300 lb of knight in armor 20 feet in 2 seconds. What is one dragon power? (a) 3000 ft-lb/sec (b) 300 ft-lb/sec (c) 6000 ft-lb/sec (d) 1000 ft-lb/sec
6. Consider an air track. Suppose a gliding cart with a mass of 0.5 kg bumps into and sticks to a stationary cart that has a mass of 1.5 kg. If the speed of the gliding cart before impact is V_{before} , how fast will the coupled carts glide after collision? (a) 1 m/sec (b) 2 m/sec (c) 4 m/sec (d) 8 m/sec
7. Let's estimate the average force on a tennis ball as it is served. The ball's mass is 0.06 kg, and it leaves the racquet with a speed of 40 m/sec (90 mph) and contact time 5 milliseconds (0.005 sec). (a) 40 N (b) 80 N (c) 240 N (d) 480 N
8. How fast would a penny dropped from the top of Sears Tower (443 meter ht) be moving when it hit the ground? (a) 83.1 m/sec (b) 93.1 m/sec (c) 103.1 m/sec (d) 73.1 m/sec
9. Calculate the force of gravity between the Earth (mass = $6 \cdot 10^{24}$ kg) and the sun (mass = $2 \cdot 10^{30}$ kg, distance = 1.5×10^{11} m) (a) 35.573×10^{21} N (b) 35.573×10^{18} N (c) 35.573 kg (d) 71.146×10^{21} N
10. How much work is done on 75N bowling ball when you lift it 1 m? What power is expended if you lift it this distance in 1 sec? (a) 75 N (b) 75 Joules (c) 25 N (d) 50 Joules
11. Due to friction, a constant force of 100 Newtons is needed to slide a box across a room. If the box moves 3 meters, how much work is done? (a) 100 Joules (b) 300 Joules (c) 100 N (d) 300 N
12. What is the impulse needed to stop a 10 kg bowling ball moving at 6 m/sec? (a) 10 kg (b) 10 kg·m/sec (c) 60 kg·m (d) 60 kg·m/sec
13. A 1000 kg automobile (car #1) runs into the rear of a stopped car (car 2) that has a mass of 1500 kg. Immediately after the collision, the cars are hooked together, and their speed is estimated to have been 4m/sec. What was the speed of car#1 just before the collision? (a) 4 m/sec (b) 6 m/sec (c) 8 m/sec (d) 10 m/sec
14. Unless acted upon by an unbalanced force, an object will (a) remain at rest (b) remain in motion with a constant velocity (c) either (a) or (b) depending on initial conditions (d) change its inertia.
15. 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) Three (d) Four
16. Which of the followings are the fundamental properties used to describe motion: (a) Length and weight (b) Length and time (c) Weight and height (d) Weight and speed
17. The action and reaction forces of Newton's third law always (a) Act on different bodies (b) Are equal in magnitude (c) Are opposite directions (d) Are all of the above
18. Work is done on an object when it is (a) moved (b) stationary (c) acted upon by a balanced force (d) none of the preceding
19. Kinetic energy is the energy of (a) position (b) motion (c) work (d) power
20. Mechanical energy is (a) always conserved (b) the same as total energy in all cases (c) the sum of kinetic and potential energies (d) none of the preceding
21. The form of energy in which mass conversion is significant is (a) electrical (b) gravitational (c) nuclear (d) chemical
22. The inertia of a body may be expressed in terms of its (a) speed (b) acceleration (c) mass (d) all of the preceding
23. The action and reaction of Newton's third law (a) are in the same direction (b) have different magnitudes (c) act on different bodies (d) can be the same force

24. For two objects of different mass in free fall (a) The accelerations are different (b) The acting forces are different (c) Air resistance is a consideration (d) The more massive object will reach the ground first if released simultaneously
25. Kinetic friction is generally _____ static friction. (a) Less than (b) More than (c) Better than (d) equal to
26. The unit of work in the SI is the (a) newton (b) ft-lb (c) joule (d) both (a) and (c)
27. The unit of energy in the SI is the (a) joule (b) newton (c) watt (d) horsepower
28. Energy cannot be (a) transferred (b) conserved (c) created (d) both (a) and (c)
29. The gravitational potential energy (a) is independent of height (b) is always positive (c) is independent of path (d) decreases with increasing height
30. The time rate of doing work is (a) energy (b) power (c) momentum (d) efficiency
31. For momentum to be conserved there must be an absence of a force that is (a) unbalanced (b) external (c) internal (d) both (a) and (b)
32. In order to reduce the "string" in catching a hard ball, one usually (a) increases the change in momentum (b) increases the contact force (c) increases the impulse (d) increases the contact time
33. The impulse is equal to the (a) force times distance (b) mass times acceleration (c) distance divided by force (d) force times time
34. 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
35. At the maximum height of a vertical projection, (a) the velocity is zero (b) the acceleration is zero (c) both (a) and (b) (d) neither (a) nor (b)
36. The orbits of the planets have the following shape(s): (a) circle (b) square (c) ellipse (d) a variety of shapes
37. A projectile (a) has a constant speed in the horizontal direction (b) is always projected in one dimension (c) has no forces acting on it (d) has no vertical acceleration
38. A piece of chalk is projected horizontally from the top edge of a table. At the same instant a piece of chalk is dropped from the same table height. (a) both will have the same velocity when they reach the floor (b) the dropped chalk will have the greater velocity (c) the projected chalk will have the greater velocity (d) the dropped chalk will reach the floor first
39. Which of the following is not a "universal" constant? (a) G (b) h (c) g (d) c, the speed of light in vacuum
40. A comet's tail (a) results from lunar attraction (b) is caused by solar gravity (c) extends away from the Sun (d) both (a) and (b)
41. The theory of gravity as being a warping of space-time was proposed by (a) Newton (b) Halley (c) Einstein (d) Lowell
42. Rockets are made more efficient by (a) greater fuel capacities (b) in-flight mass reduction (c) achieving escape velocity on blast-off (d) all of the preceding
43. The center of mass (a) always lies within a body (b) applies only to a rigid body (c) is at the center of a uniform sphere (d) both (a) and (b)
44. The particles in a uniformly rotating body all have the same (a) location (b) angular speed (c) tangential velocity (d) both (b) and (c)
45. In the absence of an unbalance torque, a rigid body will (a) remain at rest (b) remain in motion with a constant angular velocity (c) either (a) or (b) (d) none of the preceding
46. A spiraling football is an example of (a) pure translational motion (b) pure rotational motion (c) a nonrigid body (d) the general motion of a rigid body
47. A circus stilt walker stand balanced on one stilt. He is in (a) stable equilibrium (b) neutral equilibrium (c) unstable equilibrium (d) universal equilibrium
48. 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
49. 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
50. A group of two or more atoms held together by forces called chemical bonds is a (a) molecule (b) compound (c) period (d) family