

Physics 10 1st Midterm (200 pts MAX.) – TEST C
Fall 2004

1. The inertia of a body may be expressed in terms of its (a) speed (b) acceleration (c) mass (d) all of the preceding
2. 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
3. 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
4. Kinetic friction is generally _____ static friction. (a) Less than (b) More than (c) Better than (d) equal to
5. The unit of work in the SI is the (a) newton (b) ft-lb (c) joule (d) both (a) and (c)
6. The unit of energy in the SI is the (a) joule (b) newton (c) watt (d) horsepower
7. Energy cannot be (a) transferred (b) conserved (c) created (d) both (a) and (c)
8. The gravitational potential energy (a) is independent of height (b) is always positive (c) is independent of path (d) decreases with increasing height
9. The time rate of doing work is (a) energy (b) power (c) momentum (d) efficiency
10. 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)
11. 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
12. The impulse is equal to the (a) force times distance (b) mass times acceleration (c) distance divided by force (d) force times time
13. 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
14. 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)
15. The orbits of the planets have the following shape(s): (a) circle (b) square (c) ellipse (d) a variety of shapes
16. 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
17. 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
18. Which of the following is not a "universal" constant? (a) G (b) l (c) g (d) c, the speed of light in vacuum
19. 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)
20. The theory of gravity as being a warping of space-time was proposed by (a) Newton (b) Halley (c) Einstein (d) Lowell
21. 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
22. 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)
23. The particles in a uniformly rotating body all have the same (a) location (b) angular speed (c) tangential velocity (d) both (b) and (c)
24. 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
25. 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
26. A circus stilt walker stand balanced on one stilt. He is in (a) stable equilibrium (b) neutral equilibrium (c) unstable equilibrium (d) universal equilibrium

27. 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
28. If a mass of 1 kg is accelerated 1 m/s^2 by a force of 1N, what would be the acceleration of 2 kg acted on by a force of 2N? (a) 2 m/sec^2 (b) 4 m/sec^2 (c) 1 m/sec^2 (d) 1 m/sec
29. A golf ball (0.142 kg) left a player's hand at a speed of 20.0 m/sec. If the straight throw lasted 0.050 sec, determine the force exerted on the ball? (a) 20.0 N (b) 142 N (c) 56.8 N (d) 56.8 m/s^2
30. 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) 2 hr (b) 3 hr (c) 0.6666 hr (d) 1 hr
31. If force-in = 2N, force-out = 10N, then AMA is? (a) 10 (b) 5 (c) 1 (d) 20
32. If $F = 100 \text{ newton}$, area = 4m^2 . What is the pressure? (a) 100 N/m^2 (b) 50 N/m^2 (c) 25 N/m^2 (d) N
33. What is the momentum of a bicycle and rider with a total mass of 80 kg and a speed of 10 m/sec? (a) 80 kg·m/sec (b) 800 kg·m/sec (c) 8 kg·m/sec (d) 8000 kg·m/sec
34. If the speed of an object in uniform circular motion is doubled, the centripetal force will be increased by a factor of what? (a) 1 (b) 2 (c) 4 (d) 8
35. Suppose you throw a ball straight up into the air with an initial speed of 25 m/sec. How much ht will it go? (a) 25 m (b) 63.75 m (c) 31.89 m (d) none
36. 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/sec (b) 6.283 m/sec (c) 3.1416 m (d) 6.283 m
37. 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.
38. 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
39. 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
40. 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
41. 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
42. Kinetic energy is the energy of (a) position (b) motion (c) work (d) power
43. 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
44. The form of energy in which mass conversion is significant is (a) electrical (b) gravitational (c) nuclear (d) chemical
45. When the efficiency of a machine is increased (a) the work output increases (b) the work input is increased (c) perpetual motion occurs (d) the total energy is not conserved
46. With constant mass, the conservation of momentum is essentially stated in which of Newton's Laws? (a) First (b) Second (c) Third (d) Gravitation
47. Automobile air bags protect passengers during collisions by (a) reducing the impulse (b) decreasing the impulse time and increasing the impulse force (c) increasing the impulse time and decreasing the impulse force (d) decreasing both the impulse time and force
48. Momentum is (a) a vector quantity (b) dependent on mass (c) a function of velocity (d) all of these
49. 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
50. For a projection at an angle, the common factor for the x- and y-components of motion is (a) acceleration (b) speed (c) time (d) direction