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

1. For a car to accelerate, it must (a) have a constant speed (b) have a change in velocity (c) start from rest (d) none of the preceding
2. When Newton's second law is used to express weight, the accelerations is then (a) zero (b) due to gravity (c) directly proportional to the mass (d) none of the preceding
3. All objects in free fall near the Earth's surface have the same (a) Velocity (b) Speed (c) Acceleration (d) Weight
4. Any quantity capable of producing a change in motion is called a (a) Strength (b) Power (c) Force (d) Momentum
5. Galileo's legendary Leaning Tower of Pisa experiment (a) Showed objects of different weights fall at different rates (b) Confirmed Aristotle's views on motion (c) Was actually done in Venice (d) Is seriously questioned with regard to authenticity
6. The unit of power in the SI is the (a) newton (b) horsepower (c) joule (d) watt
7. The combustion of gasoline involves the release of (a) electrical energy (b) Electromagnetic energy (c) radiant energy (d) chemical energy
8. A machine can be used to change a force's (a) direction (b) magnitude (c) nature (d) both (a) and (b)
9. The total energy is conserved in (a) a conservative system (b) a nonconservative system (c) the universe (d) all of the preceding
10. A change in momentum may result from (a) an acceleration (b) a force (c) an impulse (d) all of the preceding
11. Which of the following are conserved in an elastic collision? (a) Momentum (b) Kinetic energy (c) Impulse (d) both (a) and (b)
12. Padded dashboards in automobiles reduce injury by (a) increasing friction (b) increasing the contact time (c) decreasing friction (d) stopping the passenger more quickly
13. If the velocity of a moving object is doubled without changing the mass, its momentum (a) remains the same (b) is doubled (c) is quadrupled (d) is halved
14. Impulse does not depend on (a) force (b) contact time (c) temperature (d) velocity
15. Uniform circular motion requires (a) centripetal acceleration (b) centripetal force (c) tangential velocity (d) all of the preceding
16. A cannon ball is projected at a 45-degree angle with an initial velocity v. Neglecting air resistance, at its maximum height it will have (a) no velocity (b) a maximum horizontal velocity (c) no vertical velocity (d) vertical acceleration of 9.8 m/s^2
17. The laws of planetary motion were developed by (a) Newton (b) Galileo (c) Brahe (d) Kepler
18. If air resistance is a factor in a horizontal projection or a projection at an angle, the range of the projectile would be (a) greater (b) less (c) the same
19. During a full-moon spring tide, the gravitational attractions of the Sun and moon on the Earth (a) cancel each other (b) are generally in opposite directions (c) produce higher low tides (d) produce very high tides because the moon is closer to the Sun
20. 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
21. Standing on Earth, a person experiences how many g's of force? (a) l (b) 1.5 (c) 2 (d) 4
22. At an altitude equal to the Earth's radius, a person would weigh what percentage of his or her weight on Earth? (a) 200% (b) 100% (c) 50% (d) 25%
23. If every particle of a body moves in circles about a fixed axis of rotation, it is (a) in translational motion (b) in rotational motion (c) in rolling motion (d) at rest
24. 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
25. An object in stable equilibrium will remain so as long as its center of gravity is
    (a) outside the object (b) at the same location as its center of mass (c) inside and above its original base of support (d) none of the preceding
26. Rotational kinetic energy (a) depends on the mass distribution of a body (b) is equal to I_w (c) requires the conservation of angular momentum (d) is the same as translational kinetic energy

27. What is the average speed of a cheetah that sprints 100 meters in 4 seconds? (a) 100 m/sec (b) 50 m/sec (c) 25 m/sec (d) 5 m/sec
28. What is the acceleration of a 40 kg block of cement when pulled sideways with a net force of 200N? (a) 1 m/s^2 (b) 4 m/s^2 (c) 5 m/s^2 (d) 10 m/s^2
29. Your initial speed is 10m/sec. You push accelerator so that the velocity increase (2m/sec) each second i.e. 10 m/sec, 12 m/sec, 14 m/sec. What is the acceleration? (a) 1 m/sec (b) 2 m/sec (c) $2m/sec^2$ (d) 1 sec
30. A firefighter of a mass 80 kg slides down a vertical pole with an acceleration of 4 m/s^2. What is the friction force that acts on the firefighter? (a) 80 N (b) 4 N (c) 464 N (d) None
31. 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
32. 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
33. 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
34. 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
35. The boy on the tower 5m ht throws a ball 20 m downrange. What is his pitching speed? (a) 9.8 m/sec (b) 19.8 m/sec (c) 4.9 m/sec (d) 27.8 m/sec
36. The value of g at the Earth's surface is about 9.8 m/s2. What is the value of g at a distance from the Earth's center that is four times the Earth's radius? (a) 9.8 m/s^2 (b) 0.6125 m/s^2 (c) 2.45 m/s^2 (d) 0.6125 m
37. A force (a) always produces motion (b) is a scalar quantity (c) is capable of producing a change in motion (d) both (a) and (c)
38. The air resistance on a falling object depends on its (a) shape (b) size (c) speed (d) all of the preceding
39. When a car moves at constant speed on a straight road (a) There are no forces acting on it (b) There is a constant net force acting on it (c) There is no net force acting on it (d) The net force is downward
40. If the new force acting on an object is doubled, the acceleration is (a) None (b) Double (c) Triple (d) Quadruple
41. 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
42. If motor A has twice as much horsepower as motor B, then motor A has the power capability to do (a) half the work in twice the time (b) the same work in half the time (c) Twice the work in half the time (d) none of the preceding
43. The random motion of molecules in a substance is associated with (a) electrical energy (b) heat energy (c) chemical energy (d) all of the preceding
44. Efficiency (a) has no units (b) is the same as mechanical advantage (c) may be greater than 1.0, or 100% (d) can be negative
45. A machine (a) can have a mechanical advantage greater than one (b) multiplies the work input (c) can run perpetually (d) is not subject to the conservation of energy
46. By manipulating the impulse, one can change the (a) force (b) contact time (c) momentum (d) all of the preceding
47. Which of the following are conserved in an inelastic collision? (a) Momentum (b) Kinetic energy (c) Impulse (d) both (a) and (b)
48. The impulse applied to an object is equal to the change in its (a) kinetic energy (b) acceleration (c) momentum (d) velocity
49. Momentum takes into account (a) space and time (b) collisions and heat (c) inertia and motion (d) shape and size
50. Two balls moving toward each other on a frictionless horizontal surface collided and immediately came to a complete stop. This shows that the balls (a) are perfectly elastic (b) have the same mass (c) had equal amounts of kinetic energy before impact (d) had equal amounts of momentum before impact