

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

1. 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)
2. The air resistance on a falling object depends on its (a) shape (b) size (c) speed (d) all of the preceding
3. 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
4. If the net force acting on an object is doubled, the acceleration is (a) None (b) Double (c) Triple (d) Quadruple
5. 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
6. 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
7. 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
8. 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
9. 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
10. By manipulating the impulse, one can change the (a) force (b) contact time (c) momentum (d) all of the preceding
11. Which of the following are conserved in an inelastic collision? (a) Momentum (b) Kinetic energy (c) Impulse (d) both (a) and (b)
12. The impulse applied to an object is equal to the change in its (a) kinetic energy (b) acceleration (c) momentum (d) velocity
13. Momentum takes into account (a) space and time (b) collisions and heat (c) inertia and motion (d) shape and size
14. 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
15. Centrifugal force is (a) the reaction force to centripetal force (b) a pseudo force (c) the same as centripetal force (d) a requirement for circular motion
16. The braking action of a large jet plane after landing is chiefly due to (a) tire friction (b) mechanical brakes (c) reverse thrust (d) resistance on wing foils
17. Kepler stated that the geometric shape of the orbits of the planets is a(n) (a) circle (b) parabola (c) ellipse (d) rectangle
18. The force of gravity (a) keeps the moon in orbit (b) causes us to have weight (c) produces ocean tides (d) all of the preceding
19. Which planet's discovery was a direct result of using Newton's law of gravitation? (a) Neptune (b) Uranus (c) Planet X (d) Saturn
20. A location in a gravitational field is (a) the gravitational force per unit mass at that point (b) on a line of force (c) the acceleration due to gravity at that point (d) all of the preceding
21. If a satellite near the Earth's surface does not have a minimum tangential speed of 8 km/s, it will (a) go into an elliptical orbit (b) go into a circular orbit (c) fall back to Earth (d) escape into outer space
22. A particle (a) has no physical dimensions (b) can be accurately located (c) does not have rotation (d) all of the preceding apply
23. How many radians are there in one complete rotation? (a) 2 π (b) 3 π (c) 4 π (d) 360
24. The torque on a body can be increased by increasing the (a) lever arm (b) force (c) inertia (d) both (a) and (b)

25. The angular momentum of a system is conserved when (a) the torques are balanced (b) there is an unbalanced torque (c) there is an angular acceleration (d) none of the preceding
26. As a planet or a comet approaches the Sun its speed increases so as to maintain constant (a) kinetic energy (b) velocity (c) linear momentum (d) angular momentum about the Sun
27. If a car moves with an average speed of 60 km/h, how far would it travel for 4 hours? (a) 60 km (b) 120 km (c) 240 km (d) 360 km
28. What is the acceleration of 20 kg pail of cement that is pulled upward with a force of 300N? (a) 5.2 m/s^2 (b) 5.2 m (c) 5.2 m/sec (d) 2.6 m/s^2
29. Suppose a force of 15 newton acts on an object with a mass of 5 kg. What is the acceleration of the object? (a) 15 m/sec^2 (b) 3 m/sec^2 (c) 15 m/sec (d) 5 m/sec^2
30. A boxer punches a sheet of paper in mid air and brings it from up to a speed of 25 m/sec^2 in 0.05 seconds. If the mass of the paper is 0.003 kg what force does the boxer exert on it? (a) 1.0 N (b) 0.5 N (c) 1.5 N (d) 2.0 N
31. A car moving at 50 km/h skid 15 m with locked brakes. How far will the car skid with locked brakes at 150 km/h? (a) 45 m (b) 90 m (c) 135 m (d) 180 m
32. Michael drove on the freeway 50 mph (= 22.35 m/sec). The mass of the car is 2000 kg. It has to stop in 10 sec. What is the impact force? (a) -4470 N (b) -2000 N (c) 4470 N (d) 2000 N
33. A car crashes into a wall at 25 m/sec and is brought to rest in 0.1 sec. Calculate the average force exert on a 75 kg test dummy by the seat belt. (a) -18,750 N (b) -75 N (c) 18,750 N (d) 150 N
34. 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) 9.8 m/sec (c) 14 m/sec (d) 20 m/sec
35. Suppose you throw a ball straight up into the air with an initial speed of 25 m/sec, how long will it reach to the highest pt? (a) 1 sec (b) 2 sec (c) 2.55 sec (d) 5.1 sec
36. Consider a bicycle that has wheels with a circumference of 2 m. What is the linear speed of the bicycle when the wheels rotate 1 revolution per second? (a) 2 m (b) 2 m/sec (c) 4 m (d) 4 m/sec
37. The inertia of a body may be expressed in terms of its (a) speed (b) acceleration (c) mass (d) all of the preceding
38. 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
39. 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
40. Kinetic friction is generally _____ static friction. (a) Less than (b) More than (c) Better than (d) equal to
41. The unit of work in the SI is the (a) newton (b) ft-lb (c) joule (d) both (a) and (c)
42. The unit of energy in the SI is the (a) joule (b) newton (c) watt (d) horsepower
43. Energy cannot be (a) transferred (b) conserved (c) created (d) both (a) and (c)
44. The gravitational potential energy (a) is independent of height (b) is always positive (c) is independent of path (d) decreases with increasing height
45. The time rate of doing work is (a) energy (b) power (c) momentum (d) efficiency
46. 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)
47. 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
48. The impulse is equal to the (a) force times distance (b) mass times acceleration (c) distance divided by force (d) force times time
49. 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
50. 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)