

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

Spring 2005

1. 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
2. What is the acceleration of 20 kg pail of cement that is pulled upward with a force of 300N? (a) 5.2 m/s² (b) 5.2 m (c) 5.2 m/sec (d) 2.6 m/s²
3. 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/sec² (b) 3 m/sec² (c) 15 m/sec (d) 5 m/sec²
4. A boxer punches a sheet of paper in mid air and brings it from up to a speed of 25 m/sec² 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
5. 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
6. 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
7. 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
8. 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
9. 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
10. 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
11. 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
12. If force-in = 2N, force-out = 10N, then AMA is? (a) 10 (b) 5 (c) 1 (d) 20
13. If $F = 100$ 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
14. 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)
15. The air resistance on a falling object depends on its (a) shape (b) size (c) speed (d) all of the preceding
16. 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
17. If the new force acting on an object is doubled, the acceleration is (a) None (b) Double (c) Triple (d) Quadruple
18. 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
19. 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
20. 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
21. 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
22. 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
23. 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
24. All objects in free fall near the Earth's surface have the same (a) Velocity (b) Speed (c) Acceleration (d) Weight

25. Any quantity capable of producing a change in motion is called a (a) Strength (b) Power (c) Force (d) Momentum
26. 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
27. The unit of power in the SI is the (a) newton (b) horsepower (c) joule (d) watt
28. The combustion of gasoline involves the release of (a) electrical energy (b) Electromagnetic energy (c) radiant energy (d) chemical energy
29. A machine can be used to change a force's (a) direction (b) magnitude (c) nature (d) both (a) and (b)
30. The total energy is conserved in (a) a conservative system (b) a nonconservative system (c) the universe (d) all of the preceding
31. A change in momentum may result from (a) an acceleration (b) a force (c) an impulse (d) all of the preceding
32. Which of the following are conserved in an elastic collision? (a) Momentum (b) Kinetic energy (c) Impulse (d) both (a) and (b)
33. Padded dashboards in automobiles reduce injury by (a) increasing friction (b) increasing the contact time (c) decreasing friction (d) stopping the passenger more quickly
34. 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
35. Impulse does not depend on (a) force (b) contact time (c) temperature (d) velocity
36. Uniform circular motion requires (a) centripetal acceleration (b) centripetal force (c) tangential velocity (d) all of the preceding
37. 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
38. The laws of planetary motion were developed by (a) Newton (b) Galileo (c) Brahe (d) Kepler
39. 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
40. 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
41. 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
42. Standing on Earth, a person experiences how many g's of force? (a) 1 (b) 1.5 (c) 2 (d) 4
43. 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%
44. 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
45. 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
46. 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
47. Rotational kinetic energy (a) depends on the mass distribution of a body (b) is equal to $I\omega$ (c) requires the conservation of angular momentum (d) is the same as translational kinetic energy
48. An atomic species is defined by the number of (a) electrons (b) protons (c) neutrons (d) both (b) and (c)
49. A polar bond is a type of (a) ionic bond (b) covalent bond (c) bond with symmetrical sharing (d) bond involving magnetic poles
50. A substance in which all the atoms have the same number of protons is called a/an (a) compound (b) element (c) molecule (d) none of these