

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

1. What is the acceleration of a 40 kg block of cement when pulled sideways with a net force of 200N? (a) 1 m/s<sup>2</sup> (b) 4 m/s<sup>2</sup> (c) 5 m/s<sup>2</sup> (d) 10 m/s<sup>2</sup>
2. 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<sup>2</sup> (d) 1 sec
3. A firefighter of a mass 80 kg slides down a vertical pole with an acceleration of 4 m/s<sup>2</sup>. What is the friction force that acts on the firefighter? (a) 80 N (b) 4 N (c) 464 N (d) None
4. 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
5. 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
6. 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
7. 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
8. 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
9. The value of g at the Earth's surface is about 9.8 m/s<sup>2</sup>. 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<sup>2</sup> (b) 0.6125 m/s<sup>2</sup> (c) 2.45 m/s<sup>2</sup> (d) 0.6125 m
10. 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<sup>2</sup> (b) 3 m/sec<sup>2</sup> (c) 15 m/sec (d) 5 m/sec<sup>2</sup>
11. A boxer punches a sheet of paper in mid air and brings it from up to a speed of 25 m/sec<sup>2</sup> 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
12. 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
13. 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
14. 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
15. 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
16. All objects in free fall near the Earth's surface have the same (a) Velocity (b) Speed (c) Acceleration (d) Weight
17. Any quantity capable of producing a change in motion is called a (a) Strength (b) Power (c) Force (d) Momentum
18. 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
19. The unit of power in the SI is the (a) newton (b) horsepower (c) joule (d) watt
20. The combustion of gasoline involves the release of (a) electrical energy (b) Electromagnetic energy (c) radiant energy (d) chemical energy
21. A machine can be used to change a force's (a) direction (b) magnitude (c) nature (d) both (a) and (b)
22. 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.
23. 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

24. 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
25. 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
26. 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
27. Kinetic energy is the energy of (a) position (b) motion (c) work (d) power
28. 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
29. The form of energy in which mass conversion is significant is (a) electrical (b) gravitational (c) nuclear (d) chemical
30. 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
31. With constant mass, the conservation of momentum is essentially stated in which of Newton's Laws? (a) First (b) Second (c) Third (d) Gravitation
32. 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
33. Momentum is (a) a vector quantity (b) dependent on mass (c) a function of velocity (d) all of these
34. 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
35. 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
36. Earth has its greatest orbital speed and is closest to the Sun in our (a) summer (b) winter (c) spring (d) fall
37. An object in uniform circular motion has constant (a) velocity (b) tangential acceleration (c) momentum (d) speed
38. A vertically projected object (a) has zero acceleration at maximum height (b) has a constant velocity (c) returns to its starting point with the same initial speed (d) has a greater acceleration than a horizontally projected object
39. Ocean tides occur (a) once daily (b) exactly 12 hours apart (c) only in the Southern Hemisphere (d) because of lunar gravitation
40. The acceleration due to gravity,  $g$ , (a) is a universal constant (b) increases with altitude (c) does not depend on the mass of the Earth (d) does not depend on the mass of an object
41. To be truly weightless would require (a) micro gravity (b) zero gravity (c) a  $g$  of force (d) a gravitational field
42. The weakest fundamental force is the (a) electromagnetic force (b) gravitational force (c) weak nuclear force (d) strong nuclear force
43. If every particle of a body has the same instantaneous velocity, it is (a) in translational motion (b) in rotational motion (c) in rolling motion (d) at rest
44. The moment of inertia is a measure of (a) rotational speed (b) angular acceleration (c) torque (d) rotational inertia
45. A marble in a bowl is in (a) stable equilibrium (b) unstable equilibrium (c) both (a) and (b) (d) neither (a) nor (b)
46. The time rate of change of angular velocity is known as angular (a) momentum (b) rotational velocity (c) acceleration (d) inertia
47. Which one of the following did not support atomic theory? (a) Aristotle (b) Democritus (c) Gassendi (d) Dalton
48. Substances with high melting points generally have (a) ionic bonds (b) covalent bonds (c) polar bonds (d) both (b) and (c)
49. Which of the following is not determined by the number of protons in the nucleus of an atom? (a) atomic number (b) name or type of atom (c) number of electrons in the neutral atom (d) mass number
50. Calculate the period of a meter long pendulum? (a) 0.5 sec (b) 1.00 sec (c) 2.00 sec (d) 4.00 sec