

Physics 10 1st Midterm (200 pts MAX.)
3:50 T Th, Spring 2004

1. For a car to accelerate, it must a) have a constant speed b) start from rest c) have a change in velocity d) none of the preceding.
2. When Newton's second law is used to express weight, the acceleration is then a) zero b) due to gravity c) directly proportional to the mass d) none 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. Which of the following are the fundamental properties used to describe motion a) Length and weight b) Weight and speed c) Weight and height d) Length and time
5. 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.
6. Kinetic energy is the energy of a) motion b) position c) power d) work
7. The random motion of molecules in a substance is associated with a) chemical energy b) electrical energy c) heat energy d) all of the preceding
8. 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.
9. A change in momentum may result from a) an acceleration b) a force c) an impulse d) all of the preceding.
10. Which of the following are conserved in an inelastic collision? a) Momentum b) kinetic energy c) Impulse d) both (a) and (b)
11. Padded dashboards in automobiles reduce injury by a) increasing friction b) increasing the contact time c) decreasing friction d) stopping the passenger more quickly
12. For a system of constant mass, the conservation of momentum is essentially stated in Newton's first law b) Newton's second law c) Newton's third law d) Newton's law of gravitation
13. For a projection at an angle, the common factor for the x- and y-components of motion is a) direction b) time c) speed d) acceleration
14. 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 9.8m/s^2
15. Kepler stated that the geometric shape of the orbits of the planets is a(n) a) circle b) parabola c) ellipse d) rectangle
16. A vertically projected object a) has zero acceleration at maximum height b) has a constant velocity c) has a greater acceleration than a horizontally projected object. d) returns to its starting point with the same initial speed
17. Ocean tides occur a) once daily b) because of lunar gravitation c) only in the Southern Hemisphere d) exactly 12 hours apart
18. Which planet's discovery was a direct result of using Newton's law of gravitation? a) Neptune b) Uranus c) Planet X d) Saturn
19. 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
20. The weakest fundamental force is the a) electromagnetic force b) gravitational force c) weak nuclear force d) strong nuclear force
21. A particle a) has no physical dimensions b) does not have rotation c) can be accurately located d) all of the preceding apply
22. The farther the mass of a body is from the axis of rotation, a) the smaller its rotational speed b) the larger the moment of inertia c) the larger the number of radians in a circle d) none of the preceding
23. An object in stable equilibrium will remain so as long as its center of gravity is a) at the same location as its center of mass b) inside and above its original base of support c) outside the object d) none of the preceding
24. A spiraling football is an example of a) pure translational motion b) a non rigid body c) pure rotational motion d) the general motion of a rigid body
25. White light is a) fluorescent b) ultraviolet c) polychromatic d) waves with only magnetic field

26. What is “destroyed” in destructive interference? a) Energy b) Wave form c) electric and magnetic fields d) all of the preceding
27. The polarizing direction of polarizing sunglasses is a) vertical b) horizontal c) at a 45 degree angle d) immaterial
28. Polarization involves a) orientation of field vectors b) interference c) bending of light around corners d) longitudinal waves
29. For ray reflection from a surface, a) the angle of reflection equals the angle of incidence b) the reflection angle is measured from a normal to the surface c) all the rays lie in the same plane d) all of these
30. In refraction, which of the following wave properties is unchanged? a) wavelength b) speed c) frequency d) all of these
31. In most transparent materials, which color of light has the greatest angle of refraction from the incident ray direction? a) red b) green c) yellow d) blue
32. Dispersions is responsible for a) a diamond’s brilliance b) diffuse reflection c) spherical aberration d) chromatic aberration

Answer:

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|-------|-------|-------|-------|
| 1. C | 11. B | 21. D | 31. D |
| 2. B | 12. A | 22. B | 32. D |
| 3. C | 13. B | 23. B | |
| 4. D | 14. C | 24. D | |
| 5. A | 15. C | 25. C | |
| 6. A | 16. D | 26. B | |
| 7. C | 17. B | 27. A | |
| 8. A | 18. A | 28. A | |
| 9. D | 19. D | 29. D | |
| 10. A | 20. B | 30. C | |

Physics 10 1st Midterm (200 pts MAX.)
5:25 T Th, Spring 2004

1. A force a) is a scalar quantity b) is capable of producing a change in motion c) always produces motion d) both (a) and (c)
2. All objects in free fall near the Earth's surface have the same a) Speed b) Velocity c) Acceleration d) Weight
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 I released simultaneously
4. Galileo's legendary Leaning Tower of Pisa experiment a) Confirmed Aristotle's views on motion b) Showed objects of different weights fall at different rates c) Was actually done in Venice d) Is seriously questioned with regard to authenticity
5. If motor A has twice as much horsepower as motor B, then motor A has the power capability to do a) the same work in half the time b) Twice the work in half the time c) Half the work in twice the time d) none of the preceding
6. Energy cannot be a) transferred b) conserved c) created d) both (a) and (c)
7. The gravitational potential energy a) is independent of height b) is always positive c) is independent of path d) decreases with increasing height
8. The time rate of doing work is a) power b) momentum c) energy d) efficiency
9. By manipulating the impulse, one can change the a) force b) contact time c) momentum d) all of the preceding
10. In order to reduce the "string" in catching a hard ball, one usually a) increases the change in momentum b) increases the impulse c) increases the contact force d) increases the contact time
11. The impulse is equal to the a) force times time b) force times distance c) mass times acceleration d) distance divided by force
12. Momentum takes into account a) space and time b) inertia and motion c) collisions and heat d) shape and size
13. Centrifugal force is a) the reaction force to centripetal force b) the same as centripetal force c) a pseudo force d) a requirement for circular motion
14. 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
15. A projectile a) has no vertical acceleration b) is always projected in one dimension c) has no forces acting on it d) has a constant speed in the horizontal direction
16. An object in uniform circular motion has constant a) velocity b) momentum c) tangential acceleration d) speed
17. During a full-moon spring tide, the gravitational attractions of the Sun and moon on the Earth a) cancel each other b) produce higher low tides c) are generally in opposite directions d) produce very high tides because the moon is closer to the Sun
18. The theory of gravity as being a warping of space-time was proposed by a) Newton b) Halley c) Einstein d) Lowell
19. 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
20. 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%
21. 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
22. The moment of inertia is a measure of a) rotational speed b) angular acceleration c) torque d) rotational inertia
23. As a planet or a comet approaches the Sun its speed increases so as to maintain constant a) velocity b) angular momentum about the Sun c) kinetic energy d) linear momentum

24. A circus stilt walker stand balanced on one stile. He is in a) stable equilibrium b) neutral equilibrium c) unstable equilibrium d) universal equilibrium
25. The process of an atom absorbing radiation of one wavelength and emitting another is called a) interference b) fluorescence c) incandescence d) polarization
26. Light may be polarized by a) absorption b) reflection c) scattering d) all of these
27. When the temperature of an incandescent solid is increased, a) the emitted light intensity is less b) there is an ultraviolet catastrophe c) the most intense spectral component is shifted to a higher frequency d) nothing changes
28. The bending of waves of around corners is called a) interference b) diffraction c) reflection d) polarization
29. A light ray is a line drawn perpendicular to a) a wavelength b) a wave front c) a beam d) none of the preceding
30. Dispersion is a factor in a) a diamond's fire b) the rainbow c) chromatic aberration d) all of these
31. A spherical converging lens a) is free of aberrations b) cannot form images on a screen c) is thicker at its center than at its periphery
32. Fiber optics is based on a) diffuse reflection b) total internal reflection c) dispersion d) diverging mirrors

Answers:

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|-------|-------|-------|-------|
| 1. B | 11. A | 21.A | 31. C |
| 2. C | 12. B | 22. D | 32. B |
| 3. B | 13. C | 23. B | |
| 4. A | 14. C | 24. C | |
| 5. A | 15. D | 25. B | |
| 6. C | 16. D | 26. D | |
| 7. C | 17. C | 27. C | |
| 8. A | 18. C | 28. B | |
| 9. D | 19. B | 29. B | |
| 10. D | 20. D | 30. D | |

Physics 10 1st Midterm (200 pts MAX.)
Wednesday, Spring 2004

1. The inertia of a body may be expressed in terms of it's a) mass b) speed c) acceleration d) all of the preceding
2. Unless acted upon by an unbalanced force, an object will a) remain at rest b) remain in motion with a constant velocity c) change its inertia d) either (a) or (b) depending on initial conditions
3. Kinetic friction is generally _____ static friction. a) Less than b) More than c) better than d) equal to
4. 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
5. The unit of power in the SI is the a) Newton b) horsepower c) joule d) watt
6. The combustion of gasoline involves the release of a) electrical energy b) chemical energy c) Electromagnetic energy d) radiant energy
7. The total energy is conserved in a) a conservative system b) a nonconservative system c) the universe d) all of the preceding
8. 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
9. 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)
10. 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
11. 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
12. Impulse does not depend on a) force b) contact time c) temperature d) velocity
13. Uniform circular motion requires a) centripetal acceleration b) centripetal force c) tangential velocity d) all of the preceding
14. The orbits of the planets have the following shape(s): a) circle b) square c) ellipse d) a variety of shapes
15. The laws of planetary motion were developed by a) Newton b) Galileo c) Brahe d) Kepler
16. 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
17. 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
18. The acceleration due to gravity, g , a) does not depend on the mass of an object b) is a universal constant c) increases with altitude d) does not depend on the mass of the Earth
19. A location in a gravitational field is a) on a line of force b) the gravitational force per unit mass at that point c) the acceleration due to gravity at that point d) all of the preceding
20. To be truly weightless would require a) micro gravity b) zero gravity c) a g of force d) a gravitational field
21. 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
22. The torque on a body can be increased by increasing the a) lever arm b) force c) inertia d) both (a) and (b)
23. A marble in a bowl is in a) unstable equilibrium b) stable equilibrium c) both (a) and (b) d) neither (a) nor (b)
24. The time rate of change of angular velocity is known as angular a) momentum b) rotational velocity c) acceleration d) inertia
25. An atomic species is defined by the number of a) electrons b) protons c) neutrons d) both (b) and (c)
26. Elements in a vertical column in the periodic table a) have the same number of protons b) form a period c) have similar atomic masses d) have similar chemical properties
27. A polar bond is a type of a) ionic bond b) bond with symmetrical sharing c) covalent bond d) bond involving magnetic poles.

28. A liquid has a) definite shape and volume b) definite volume but no definite shape c) no definite shape or volume d) none of the preceding
29. A material might be made denser by a) burning b) stretching c) compacting d) heating
30. All materials are to some extent a) polymers b) brittle c) elastic d) hard
31. Plastic deformation occurs a) chiefly in ceramic materials b) only for metals c) only in plastics d) when the elastic limit is reached
32. A solid that consists of covalently bonded atoms such that the solid consists of one large a) micromolecular b) macromolecular c) amorphous d) ionic

Answers:

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|-------|-------|-------|-------|
| 1. A | 11. C | 21. B | 31. D |
| 2. D | 12. C | 22. D | 32. B |
| 3. A | 13. D | 23. B | |
| 4. D | 14. C | 24. C | |
| 5. D | 15. D | 25. B | |
| 6. B | 16. B | 26. D | |
| 7. D | 17. D | 27. C | |
| 8. C | 18. A | 28. B | |
| 9. D | 19. A | 29. C | |
| 10. C | 20. B | 30. C | |

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