1. Which of these isn't a fundamental force?
    a. Electromagnetic Force
    b. Strong Nuclear Force
    c. Weak Neuclear Force
    d. Normal Force
2. Out of these options, which type of electromagnetic radiation has the highest amount of energy?
    a. Blue light
    b. Radio waves
    c. Infrared light
    d. Ultraviolet light
3. Which of the following mediums will light move the fastest in
    a. Water
    b. Glass
    c. Air
    d. Diamonds
4. A spring with spring constant 50N/m is attached to a wall on one end and a mass of 2 kg on the other end. What is the frequency of the oscillations?
    a. 5π
    b. $5/2\pi$
    c. $2\pi/5$
    d. $5/\pi$
5. What is the ratio of the electric field strength from an infinite sheet of uniform charge density at 5 meters away and 20 meters away
    a. 4:1
    b. 2:1
    c. 1
    d. You must know the exact charge density of the sheet
6. The density of alluminum is approximately 2700kg/m^3. Water's density is 1000kg/m^3. If you dropped a lump of alluminum into water, ignoring drag forces, what would be the acceleration of the lump if it was motionlessly placed into water?
    a. 5.9m/s^2
    b. 6.3m/s^2
    c. 9.8m/s^2
    d. 17m/s^2
7. Which of the following would reach the bottom of a ramp first? Assume they are rolling without slipping.
    a. A solid ball with uniform density
    b. A solid disk with uniform density
    c. A ring with uniform density
    d. A spherical shell with uniform density
8. Which of the following is *not* a form of antimatter?
    a. Positron
    b. Antiproton
    c. Dark Matter
    d. Antineutron

9. A ball is thrown on a flat surface at an angle of 60 degrees above the horizontal. Of the following angles, which one would allow the ball (thrown at said angle) to reach the same position it reaches from being thrown at 60 degrees?
    a. 61 degrees
    b. 45 degrees
    c. 30 degrees
    d. 15 degrees
10. Which of the following elements are the densist?
    a. Gold
    b. Lead
    c. Diamonds
    d. Netherite
11. An object is suddenly launched upwards on a flat surface. It takes 10 seconds for it to fall back down. What is the initial upwards velocity?
    a. 30m/s
    b. 50m/s
    c. 75m/s
    d. 100m/s
12. Which of the following elementary particles is the carrier of the electromagnetic force?
    a. W boson
    b. Gluon
    c. Muon
    d. Photon
13. What are the units of electric flux?
    a. Nm^2/C
    b. J/C^2
    c. Flux is unitless
    d. F/V
14. A soccer player kicks a soccer ball. If the soccer player's foot hits the ball at 10m/s what is the speed of ball immediately after the collision?
    a. 10m/s
    b. 15m/s
    c. 20m/s
    d. 25m/s
15. In a circuit, there are 3 resistors connected in parallel. Resistor 1 has resistance 2 ohms, resistor 2 has resistance 3 ohms, and resistor 3 has resistance 5 ohms. What is the effective resistance of the circuit.
    a. 11/10 ohms
    b. 31/30 ohms
    c. 29/30 ohms
    d. 9/10 ohms
16. What is the chemical formula for methane?
    a. CH4
    b. C2H6
    c. NH3
    d. HNO3
17. How fast would a car need to drive to not slide down a open cone angled 30 degrees above the horizontal with radius 20 meters?

a. 5m/s
b. 10m/s
c. 15m/s
d. 20m/s

18. What is the Kinetic energy of an object after it is launched from a spring with spring constant 20N/m compared 10 centimeters.
    a. 0.5J
    b. 0.2J
    c. 0.1J
    d. 0.05J
19. Which of the following stays the same after light enters another material?
    a. Frequency
    b. Wavelength
    c. Speed
    d. Direction
20. The atom is comprised of many subatomic particles. Which of the following is *not* seen in an atom?
    a. Gluon
    b. Electron
    c. Up quark
    d. Z boson

21. In which of the following situations would an object be accelerated?
    I. It moves in a straight line at a constant speed.
    II. It moves with uniform circular motion.
    III. It travels as a projectile in a gravitational field with negligible air resistance.
    a. I only
    b. I and II only
    c. II and III only
    d. I, II, and III

22. According to Newton's third law of motion, for every action, there is an equal and opposite reaction. Which of the following scenarios best exemplifies this law?

(A) A rocket accelerating in space.
(B) An ice skater tucking in their arms to spin faster
(C) A car moving at a constant speed on a straight road.
(D) A balloon filled with air floating in a room.

23. A 500-kilogram sports car accelerates uniformly from rest, reaching a speed of 30 meters per second in 6 seconds. During the 6 seconds, the car has traveled a distance of

(A) 15 m
(B) 30 m
(C) 60 m
(D) 90 m
(E) 180 m

24. What is the relationship between kinetic energy and potential energy?

(A) Kinetic energy is the energy of motion, while potential energy is stored energy due to position or condition.
(B) Kinetic energy is always greater than potential energy.
(C) Potential energy is always greater than kinetic energy.
(D) Kinetic energy and potential energy are unrelated.

25. Which of the following statements best describes the Law of Conservation of Momentum?

(A) The total momentum of a system remains constant if no external forces act on it.
(B) Momentum is created when objects collide.
(C) Momentum can be destroyed by friction.
(D) Momentum is always conserved in elastic collisions but not in inelastic collisions.
(E) Momentum is only conserved in collisions involving objects of the same mass.

26. What factors affect the period of a pendulum with a massless string?

(A) Mass of the pendulum bob and length of the pendulum string.
(B) Amplitude and length of the pendulum string.
(C) Mass and amplitude of the pendulum bob.
(D) Gravitational force and length of the pendulum.

27. Which of the following correctly defines work in physics?

(A) The product of force and distance in the direction of the force.
(B) The product of force and distance regardless of direction.
(C) The product of mass and velocity.
(D) The product of force and time.
(E) The energy required to move an object from one point to another.

28. In the absence of air friction, an object dropped near the surface of the Earth experiences a constant acceleration of about 9.8 m/s2. This means that the

(A) Speed of the object as it falls is 9.8 m/s
(B) Speed of the object increases 9.8 m/s during each second
(C) Object falls 9.8 meters during each second
(D) Object falls 9.8 meters during the first second only

29. An object is released from rest on a planet that has no atmosphere. The object falls freely for 3.0 meters in the first second. What is the magnitude of the acceleration due to gravity on the planet?
(A) 1 .5 m/s2
(B) 3.0 m/s2
(C) 6.0 m/s2
(D) 10.0 m/s2
(E) 12.0 m/s2

32. Two people are in a boat that is capable of a maximum speed of 5 kilometers per hour in still water, and wish to cross a river 1 kilometer wide to a point directly across from their starting point. If the speed of the water in the river is 5 kilometers per hour, how much time is required for the crossing?

(A) 0.05 hr

(B) 0.1 hr

(C) 1 hr

(D) The point directly across from the starting point cannot be reached under these conditions.