1. Which of the following scientists is responsible for the exclusion principle which states that two objects may NOT occupy the same space at the same time? Was it:
A) Heisenberg
B) Bohr
C) Teller
D) Pauli

2. The force acting between two point charges can be computed using which of the following laws?
A) Ohm's Law
B) Ampere's Law
C) Coulomb's Law
D) Newton's Second Law.

3. Induced electric currents can be explained using which of the following laws?
A) Gauss's Law
B) Faraday's Law
C) Ohm's Law
D) Ampere's Law

4. Assume a ray of light is incident on a smooth reflecting surface at an angle of incidence of 15 degrees to the normal. What is the angle between the incident ray and the reflected ray?
A) 25
B) 15
C) 20
D) 30

5. The focal length of a concave spherical mirror is equal to 1 meter. What is the radius of curvature of this mirror?
A) 2
B) 1
C) 3
D) 4

6. An organ pipe which is open at both ends resonates at its fundamental frequency. Neglecting any end effects, what wavelength is formed by this pipe in this mode of vibration if the pipe is 2 meters long?
A) 2 meters B) 4 meters
C) 6 meters D) 8 meters.

7. The wave nature of light is demonstrated by which of the following?
A) the photoelectric effect
B) color
C) the speed of light
D) diffraction

8. The Tesla and the Gauss are units of measure of:
A) conductance
B) magnetic field strength
C) magnetic flux
D)electrical current

9. Which of the following colors of visible light has the longest wavelength? Is it:
A) violet
B) green
C) yellow
D) red

10. An x-ray photon collides with a free electron, and the photon is scattered. During this collision there is conservation of:
A) momentum but not energy
B) neither momentum nor energy
C) energy but not momentum
D) both momentum and energy

11. In the sun, helium is produced from hydrogen by:
A) radioactive decay
B) disintegration
C) fission
D) fusion

12. A car is moving along a straight horizontal road at a speed of 20 meters per second. The brakes are applied and a constant force of 5000 Newtons decelerates the car to a stop in 10 seconds. The mass of the car is:
A) 1250 kilograms
B) 2500 kilograms
C) 5000 kilograms
D) 10,000 kilograms

13. According to the second law of thermodynamics, energy tends to become more and more unavailable for conversion from:
A) thermal to kinetic energy
B) kinetic to thermal energy
C) thermal to mechanical energy
D) mechanical to thermal energy

14.Which one of the following is the name of a device used to measure voltage without drawing ANY current from the circuit being measured? Is it:
A) a wattmeter
B) a galvanometer
C) an ammeter
D) a potentiometer

15. A 10,000-watt motor operates an elevator weighing 5000 newtons. Assuming no frictional losses, how high is the elevator raised in 10 seconds. Is it raised:
A) 2 meters
B) 20 meters
C) 50 meters
D) 100 meters

16. A machine's output is 4000 joules and its frictional losses are 1000 joules. Which of the following is its efficiency? Is it:
A) 25% B) 30%
C) 75% D) 80%

17. A 10 kilogram ball falls from a height of 5 meters and rebounds from the floor to a height of 3 meters. The energy lost by the ball is:
A) 20 joules B) 98 joules
C) 196 joules D) 294 joules

18. A rise in temperature of 20 Kelvin degrees is equal to a rise of:
A) 20 degrees Celsius
B) 36 degrees Celsius
C) 68 degrees Celsius
D) 293 degrees Celsius

19. A kilocalorie is equal to one of the following. Is it equal to:
A) 4.2 Joules
B) 1000 Joules
C) 4200 Joules
D) 10,000 Joules

20. The ENERGY associated with a photon depends upon the photon's:
A) velocity
B) frequency
C) amplitude
D) the brightness of the source from which it comes

21. The potential difference across a 4 ohm resistor is 20 volts. Assuming that all of the energy dissipated by this resistor is in the form of heat, how many joules of heat are radiated in 10 seconds?

Answer: …….

22. Five volts are applied across the plates of a parallel plate capacitor. The distance of separation of the plates is .02 meters. What is the magnitude of the electric field inside the capacitor?

Answer: …….

23. Used normally, a 3000-watt, 150 volt light bulb requires how many amps of current?

Answer: …….

24. The focal length of a concave mirror is 2 meters. An object is positioned 4 meters in front of the mirror. Where is the image of this object formed?

Answer: …….

25. The speed at which a wave propagates down a string is 300 meters per second. If the frequency of this wave is 150 Hertz, what is the wavelength of this wave?

Answer: …….