1. A vector is a quantity that has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. A cannonball is launched horizontally from a cliff. If it leaves the barrel of the cannon with a velocity of 75 m/s, how far downrange will the cannonball be 2 seconds later?

3. A volleyball player jumps up to spike a ball. Once her feet are off the floor, what is the player’s acceleration ? Direction?

4. A car accelerates at 4 . Assuming the car starts from rest, how much time does it need to accelerate to a speed of 52 ?

5. A soup bowl falls off of a table. It takes 0.4 sec to hit the ground. How high was the table?

6. A golf ball and a baseball are dropped at the same time. In the absence of air resistance, which ball has the greater acceleration?

7. Why is Physics the most basic science?

8. An apple tossed vertically upward rises, reaches its highest point, and then falls back to its starting point. During this time, the direction of the acceleration of the apple is always \_\_\_ and directed \_\_\_\_\_\_\_\_\_\_.

9. Nine seconds after starting from rest, a car is moving at 45 m/s. What is the car’s average acceleration?

10. You take a trip that covers 600 km in 8 hours. What was your average speed?

11. A ball is thrown straight up. At the top of its path, its acceleration is \_\_\_.

12.How are the horizontal component of a projectile’s velocity and the vertical component of the velocity related?

13. When you look at the speedometer in a moving car, you can see the car’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ speed.

14. A ball is thrown into the air at an angle of 20 degrees above the horizontal and land on a target that is at the same level as that where the ball started. The ball will also land on the target if it is thrown at an angle of \_\_\_ degrees.

15. Define speed.

16. On the moon, when something falls to the ground, it accelerates while falling. This acceleration is called acceleration due to gravity and is symbolized by the letter “g” and is nearly equal to 1.6 . What is the value of g close to the surface of the Earth?

17. What is the resultant vector formed by 12-unit component vector and a 5-unit component vector at right angles to each other?

18. How would you test a scientific hypothesis.

19. Acceleration is defined as …

20. If you drop a feather and a penny at the same time IN A TUBE FILLED WITH AIR, which will reach the bottom of the tube first? Why?

21. In the absence of air resistance, objects fall at a constant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?

22. Eight seconds after starting from rest, a freely falling object will have a speed of about \_\_\_.

23. A scalar is a quantity that has \_\_\_.

24. What are the steps of the Scientific method-

25. What makes something a projectile?

26. The two measurements necessary for calculating average speed are

27. A car drives a distance of 80 km in a time of 2 hours. Its average speed is:

28. A block of ice is set in motion across a frozen pond. If ice friction and air resistance are ignored, the force needed to keep the ice block sliding at constant velocity is:

29. While an object near the earth’s surface is in free fall, its velocity \_\_\_\_\_\_\_\_\_\_\_.

30. A heavy object and a light object are dropped at the same time from rest in a vacuum. Which hits the ground first? Why?

31. Why can a sheet of paper can be withdrawn from under a container of orange juice without toppling it if the paper is jerked quickly?

32. If your snowmobile runs out of fuel while you are driving, the engine stops but you do not come to an abrupt stop. Why?

33.Describe the motion of a moving object if no external forces are acting on it.

34. A kilogram is a measure of an object's \_\_\_\_\_\_\_

35. How would you find a person’s weight?

36. If object A has twice as much mass as object B, what also does object A have double?

37. Compared to the mass of a certain object on Earth, what is the mass of the same object on Saturn?

38. What are the units of force?

39. What are the units of weight?

40. Why is force a vector quantity?

41. An object is propelled along a straight-line path by a force. If the net force were tripled, the object's acceleration would be \_\_\_\_\_\_

42. An object is propelled along a straight-line path in space by a force. If the mass of the object somehow becomes four times as much, its acceleration \_\_\_\_\_\_\_\_\_\_\_\_\_

43. An object is pulled northward by a force of 20 N and at the same time another force of 15N pulls it southward. What is the magnitude of the resultant force on the object?

44. A 30-N falling object encounters 30 N of air resistance. The net force on the object is \_\_\_\_\_\_

45. Whenever the net force on an object is zero, its acceleration \_\_\_\_\_\_

46. A 2-kg mass at the earth's surface weighs \_\_\_\_\_\_

47. A minivan has a mass of 1500 kg and accelerates at 3 meters per second per second. What is the magnitude of the net force exerted on the minivan?

48. A tractor exerts a force of 4000 N on a hay wagon, accelerating it at 2 meters per second per second. What is the mass of the hay wagon?

49. A girl pulls on a 5-kg sled with a constant horizontal force of 20 N. If there are no other horizontal forces, what is the sled’s acceleration in meters per second per second? \_\_\_\_\_\_

50. The force required to maintain an object at a constant velocity in outer space is equal to \_\_\_\_\_\_

51. A woman weighing 600 N stands at rest on two bathroom scales so that her weight is distributed evenly over both scales. The reading on each scale is \_\_\_\_\_\_

52. A ball is thrown vertically into the air. What is its acceleration in meters per second per second at the top of its path?

53. A hunter shoots a crossbow. Consider the action force to be exerted by the bowstring against the arrow. The reaction to this force is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_

54. A hockey player uses his stick and hits a puck with a force of 500 N. The reaction force that the puck exerts against the stick is equal to \_\_\_\_\_\_\_\_\_\_\_\_?

55. A car traveling at 80 km/hr strikes an unfortunate pigeon and splatters it. Which object has the greater force acting on it?

56. Which of the following has the largest momentum relative to the Earth? \_\_\_\_\_\_

A) a pickup truck speeding along a highway

B) a dog running down the street

C) the Science building on campus

D) a tightrope walker crossing Niagara Falls

E) a Mack truck parked in a parking lot

57. A shotgun recoils while firing a load of buckshot. Why is the speed of the shotgun's recoil small compared to the speed of the buckshot?

58. In order to catch a foul ball, a baseball fan extends the hand forward before impact with the ball and then lets it ride backward in the direction of the ball's motion. How does this reduce the force of impact?

59. When you jump from an elevated position you usually bend your knees upon reaching the ground. By doing this, you make the time of the impact about 10 times as great as for a stiff-legged landing. How does this affect the force of impact on your legs?

60. Padded steering wheels in cars are safer in an accident than non-padded ones. Why is it safer for a driver hitting the wheel?

61. Define Work

62. If Harry the Hat pushes an object with three times the force for three times the distance, how much has the work changed?

63. How is the amount of potential energy possessed by an elevated object related to the work done in lifting the object?

64. What is the equation for kinetic energy?

65. How is kinetic energy different from potential energy?

66. A rock in a sling shot has 100 Joules of potential energy. Assuming no loss due to heat, how much kinetic energy does the rock have?

67. A boy on a sled has 10,000 Joules of potential energy at the top of a hill. Assuming no loss due to friction, how much kinetic energy does he have at the bottom of the hill?  
68. Walking and running up the stairs require the same amount of work but different amounts of \_\_\_\_\_\_\_\_?

69. Suppose a horse is moving with 5000 J of kinetic energy. If the horse triples his speed, how much kinetic energy would it then have?

70. You push for an hour or for 2 hours against a stationary building. How much work is done in either case?

71. Joe does the same amount of work as Sally in ½ the time. Who has the higher power output? By how much?

72. A boy on a sled has 10,000 J of potential energy at the top of a hill. Halfway down, how do the potential and kinetic energies compare? Assume no loss due to friction.

73. The earth is gravitationally attracted to the moon. How is the force on the moon related to the force on the earth?

74. Two objects move away from each other. As they get further away from each other, what happens to the force between them?

75. What does the value of G tell us about the relative size of gravitational forces?

76. Name the 3 ways substances absorb heat energy.

77. Metal is a good conductor of heat. How is it as an insulator?

78. Convection is limited to what types of substances?

79. The pavement is a good absorber of heat on a hot summer day. What else (in terms of heat transfer) does the pavement do well?

80. Hot water will cool to room temperature fastest in what color pot?

81. Cold water will heat to room temperature fastest in what color pot?

82. How are gravitational forces and electrical forces different?

83. Two positive charges are far apart, then brought closer together. What happens to the electrical force between them?

84. A positive and negative charge are far apart, then brought close together. What happens to the electrical force between them?

85. What do like charges do to each other? What do opposite charges do to each other?

86. How are the charges of protons and electrons related?

87. Why is it safe to inside a metal shed during a lightning storm?

88. If you double the distance between 2 charges, what happens to the force between them?

89. What does the value of k tell us about the relative size of electric forces?

90. How are gravitational forces and electrical forces similar?

91. What is the unit of electrical resistance? Current? Power?

92. Find the current through a 20 Ohm resistor connected to a 220 V power supply.

93. What happens to a material’s resistance as it gets wider? Shorter? Both?

94. A toaster has a resistor that carries 4 A at 120 V. What is its power?

95. You have a complex circuit comprised of 3 light bulbs. When one burns out, the others go out. What type of circuit is this?

96. You have a complex circuit comprised of 3 light bulbs. When one burns out, the others stay lit. What type of circuit is this?

97. How much power is dissipated when a 5 ohm resistor carries 5 A?

98. What is the source of the electrons lighting an AC light bulb?

99. What is the time needed for a wave to make 1 complete cycle called?

100. Define wavelength, frequency, amplitude, node crest and trough.

101. What happens when 2 or more waves overlap one another.

102. Define constructive and destructive interference.

103. How are frequency and period related? If you triple the frequency, what happens to the period?

104. How far does a wave travel during 1 period?

105. The frequency of a ocean wave is .2 Hz. What is the wave’s period?

106. Give a common example of a longitudinal wave.

107. Give a common example of a transverse wave.

108. Can sound travel in a vacuum? Can light?

109. Among solids, liquids and gases, sound travels fastest through which medium? Which medium does sound travel the slowest?

110. Sound travels at 340 m/s. How long is a 170 Hz tone’s wavelength?

111. What has to occur in order for a Doppler effect to occur?

112. The frequency of sound determines what property of sound?

113. What happens to sound’s frequency as the object creating sound approaches you? As it recedes from you? What happens to the speed of sound?

114. A sound that has a frequency of over 20,000 Hz is called what?

115. A bullet travels faster than the speed of sound. What do we call something that moves that fast?

116. What is resonance?

117. Ella Fitzgerald caused a wine glass to shatter with her voice. This is a demonstration of what phenomena?

118. Two frequencies of 100 Hz and 104 Hz are sounded simultaneously. What is the result?

119. What are the types of electromagnetic waves?

120. Do waves transmit energy? Matter? Both? Explain.