**Physics – Fall Semester 2018 Review**

**Unit 1- Intro to Physics**

\_\_\_\_\_1. Express the following number in the correct form of scientific notation: 12,349

\_\_\_\_\_2. Express the following number in the correct form of scientific notation: 0.00013

\_\_\_\_\_3. Express the following calculation in the correct form using scientific notation: (3.0 x 104) (6.3 x 105)

\_\_\_\_\_4. Convert 120 km/hr into miles/hr (1 mile = 1.609 km)

\_\_\_\_\_6. Convert the following 293 m to \_\_\_\_ km.

\_\_\_\_\_7. The symbols for units of length in order from smallest to largest are

 a. m, cm, mm, and km. b. mm, m, cm, and km. c. km, mm, cm, and m. d. mm, cm, m, and km.

\_\_\_\_\_8. Convert 26,000 meters to miles. (1 mile = 1,609 meters)

**Unit 2- 1D Kinematics**

\_\_\_\_\_9. Theunit we use in Physics class for speed is \_\_\_\_.

\_\_\_\_\_10. Speed can be defined as:

\_\_\_\_\_11. When you look at the **speed**ometer in a moving car, you can see the cars:

\_\_\_\_\_12. Acceleration is defined as:

\_\_\_\_\_13. If you drop a shotput and a softball at the same time, which one will strike earth’s surface first?

\_\_\_\_\_14. On a Velocity-Time graph, the slope tells us \_\_\_\_.

\_\_\_\_\_15. A ball is thrown straight up into the air. At the very top of its path, its **velocity** is \_\_\_\_.

\_\_\_\_\_16. You take a trip that covers 240 km in 4 hours. What is your speed?

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_17. The unit for acceleration is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_18. For the Distance-Time graph shown below, what is the change in position of the object during the time
 interval from 0 to 20 seconds?



\_\_\_\_\_19. A car accelerates at 2 m/s2. Assuming the car starts from rest, how much time does it need to get to a
 speed of 30 m/s?

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_20. A vector is a quantity that has both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_21. The rate at which velocity changes is called\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_22. Give an example of a scalar quantity.

\_\_\_\_\_23. The final position minus the initial position is the \_\_\_\_.

\_\_\_\_\_24. Velocity is different from speed in that velocity is speed in a given \_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_25. What is the x-component of a resultant vector of magnitude 30m oriented at a direction of 300 with
 respect to the x-axis?

\_\_\_\_\_26. If the forces acting on an object are balanced then the object will or will not accelerate?

**Unit 3- 2D Kinematics**

\_\_\_\_\_27. After launch, the horizontal component of a projectile's velocity vector (neglect air resistance) \_\_\_\_.

\_\_\_\_\_28. A cannonball is launched **horizontally** from a tower. If it is fired at 50 m/s, what horizontal distance will
 the ball have traveled in 2 seconds after launch?

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_29. A coin released at rest from the top of a tower hits the ground after falling 1.5 s. What is the velocity of
 the coin as it hits the ground? (Disregard air resistance. g = -9.8 m/s2.)

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_30. A baseball is released at rest from the top of the Washington Monument. It hits the ground after falling
 for 6 s. What was the height from which the ball was dropped? (Disregard air resistance. g = -9.8 m/s2.)

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_31. A stone is thrown horizontally at 9.2 m/s from the top of an 80m cliff. What is the horizontal distance the
 stone travelled?

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_32. The cosine of an angle is defined as (hint: SOHCAHTOA)?

\_\_\_\_\_33. What would be the displacement of a 4m step followed by a 3m step taken at right angles to each
 other?

\_\_\_\_\_34. Suppose a small plane can fly at 200 km/hr. Suppose also that there is a 40 km/hr wind pushing from
 behind. How fast does the plane's shadow move across the ground?

\_\_\_\_\_35. A quantity that has both magnitude and direction is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_ 36. A soccer ball is kicked with an initial velocity of 10 m/s at an angle of 30ᵒ to the horizontal. What is the maximum vertical height the projectile travels?

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| Formula: | Plug in numbers:  | Answer: |

**Unit 4- Newton’s Laws**

\_\_\_\_\_37. A bag of groceries has a mass of 10 kg and a weight of about \_\_\_\_.

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_38. Force is a scalar or vector quantity?

\_\_\_\_\_39. The Law of Inertia states that an object \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_40. Force and acceleration are related to each other through Newton’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ law.

\_\_\_\_\_41. A 100 kg safe is pushed across a level floor. The coefficient of friction is 0.35. What is the magnitude of
 the frictional force acting on the safe?

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_42. The mass of a dog that weighs 100N is:

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_43. A 40 N force and a 30 N force act upon an object in opposite directions. What is the magnitude of the
 net force acting upon the object?

\_\_\_\_\_44. The 40 N force and the 30 N force now act upon the object at right angles to each other. What is the

 magnitude of the net force acting upon the object?

\_\_\_\_\_45. In a free body diagram, the force that always points straight down is the \_\_\_\_\_\_\_\_\_\_\_ force.

\_\_\_\_\_46. The unit of mass is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_47. The force due to gravity acting upon on an object is the same as its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 ­\_\_\_\_\_48. The normal force is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the surface the object is on.

\_\_\_\_\_49. A boy pushes a box with a mass of 18 kg and it moves at an acceleration of 3.6 m/s2. What is the net
 force acting upon the box?

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_50. The normal force of an object on an incline is equal to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ force.

\_\_\_\_\_51. A tow truck exerts a force on a car of 2000 N and it leads to an acceleration of 2 m/s2. What is the car’s
 mass?

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_52. A 980 kg box is sitting at rest on a horizontal surface. Calculate the normal force acting on the box.

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| Formula: | Plug in numbers:  | Answer: |

\_\_\_\_\_53. Which one of Newton's Laws describes forces that always occur in pairs that are equal but opposite?

**Unit 5- Energy, Work, and Power**

**\_\_\_\_\_** 54. The SI unit for work or energy is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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| Formula: | Plug in numbers: | Answer: |

\_\_\_\_\_ 55. A rollercoaster car and passengers have a combined mass of 1,750 kg, and they descend the first hill at a speed of 12.9 m/s What is the Kinetic energy that they experience?

\_\_\_\_\_ 56. Tom, a cat whose mass is 5.45 kg, is napping on top of the refrigerator when he rolls over and falls. Tom has a kinetic energy of 85.5 J just before he lands on his feet on the floor. How tall is the refrigerator?

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| Formula(s): | Plug in numbers: | Answer: |

\_\_\_\_\_ 57. Emily gains 9,565 J of potential energy by jumping to a height of 2 meter from the ground. What is the mass of the girl?

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| Formula(s): | Plug in numbers: | Answer: |

\_\_\_\_\_\_ 58. A book is being lifted into a student’s locker with a force of 12N. The book is being lifted a distance of 1.5m. What is the work being done on the book?

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| Formula(s): | Plug in numbers: | Answer: |

­­\_\_\_\_\_ 59. How much power must be generated to bring a 2,500 kg train to the top of a 50 meter hill in 30 seconds?

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| Formula(s): | Plug in numbers: | Answer: |

\_\_\_\_\_ 60. We measure work in Joules and Energy in Joules. Are these really the same units? Explain.

\_\_\_\_\_ 61. The energy of an object that is moving (changing its position) is called\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_ 62. A joule is the same as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (units).