PHYSICS FINAL EXAM STUDY GUIDE 2

1.Define: uniform circular motion, centripetal acceleration, centripetal force.

2. Give an example of circular motion.

3. In what direction do the conditions below act? a. centripetal acceleration b. Centripetal force c. Fw at the top of a vertical circle d. Fw at the bottom of a vertical circle e. Vmin

4. In a vertical circle: a. Where is the velocity the greatest? B. Where is the velocity the least? c. Where is the Fc the greatest? d. Where is Fc the least?

5. A merry go round has 4 m radius and rotates 12 times per minute. A rider weighs 800N. Find the velocity of the rider sitting at the edge.

6. Find the Ac of the rider in problem #5.

7. Find the Fc of the rider in problem #5.

8. What is the pendulum equation?

9. A weight is whirled in a horizontal circle at the end of a cord 1-- cm long. If the tension (Fc) in the cord is 3N, what is the speed of the weight? mass=200 g

10. The period of a pendulum is affected by _____.

11. What are the units for period?

12. What are the units for frequency?

13. Define: pendulum and periodic motion.

14. A pendulum has a period of .3 seconds and is .1 m long. What is the acceleration due to gravity at the location of the pendulum.

15. A pendulum with a long cord as a (greater, lesser) period than one with a short cord.

16. Define: work, Ep, Ek, work, dissipative forces, conservative forces, joule gravitation Ep, law of conservation of mechanical energy.

17. Work is a _____ quantity.

18. The six simple machines are variations of two basic types: _____

19.What are the units for work? Show how they are derived.

20. How much work is done in pushing a crate weighing 900 N up an inclined plane 12m long that makes an angle of 12 degrees with the horizontal?

21. What is the equation for efficiency? Show units.

22. An inclined plane is 7m long and 3m high. u=.5. A. What force is required to pull a weight of 20,000 N up the incline at a constant velocity.

23. What is the % efficiency of the plane?

24. How much work is required to raise mass of 80kg to a height of 5m with a pulley system if the efficiency of the system is 80%?

25. Define: power, watt

26. A 65 kg crate is to be pushed up an inclined plane 3m long that makes an angle of 25 degrees with the horizontal. u=.15. How much work must be done?

27. A rock is dropped from a building that is 180 m high. Its mass is 60 kg. What are the Ep and Ek after the rock has fallen for 2.2 seconds?

28. What is the velocity of the rock above as it hits the ground?

29. Define momentum, elastic collisions, inelastic collisions, law of conservation of momentum, impulse

30. What are the units of momentum?

31. The law of conservation of momentum is explained by Newton's _____ law of motion.
32. A ball having a mass of 4 kg and a velocity of 3 m/s east collides with another ball with a mass of 2 kg and a velocity of 1m/s also east and along a straight line. After the collision, the more massive ball has a velocity of 1.5m/s east. What is the final velocity of the less massive ball?

33. A freight car with a mass of 300,000 kg travels at a velocity of 2.0 m/s. It collides with a stationary car with a mass of 150,000 kg on a horizontal track. The cars connect and roll together after the impact. What is the velocity of the connected cars?

34. For how many seconds must a force of 750 N, northward, act to impart the momentum of a car, mass 1500 kg, moving at a velocity of connected cars?

35. Wo is always less than Wi because _____.

36. A pulley system has an efficiency of 82%. How much of the rope must be pulled in if a force of 750 N is needed to lift a 120kg desk 3m?

37. Define: specific heat, endothermic, exothermic, heat of fusion, heat of evaporation, calorimeter.

38. Condensation is a _____ process.

39. Evaporation is a _____ process.

40. Define: Law of heat exchange, boiling, temperature, heat, melting, internal energy, calorie, joule.

41. What is the specific heat of silver if 550 J is required to raise the temperature of 80 g of silver from 25 to 55 degrees celsius?

42. What is the final temperature of a mixture of 60 g of water at 75 degrees and 30 g of what at 0 degrees?

43. An aluminum cylinder (c= .921 J/gC), mass 60 g, is placed in a 100 g brass calorimeter (c= .394 J/gC) with 300 g of water at 20 degrees celsius. WHat equilibrium temperature is reached after the addition of 30 g of steam (c= 2.01 J/gC) at 120? (c=4.186 J/gC for water)

44. Water has a point of maximum density at _____ degrees celsius.
45. A converging lens with a focal length of 15.0 cm is placed 530 cm from a light bulb. Where would you place a screen to focus an image of the object?

46. An object is 32.5 cm from a converging lens with a focal length of 12.0 m. Calculate the distance for the image from the lens.

47. An object 30.0 cm from a converging lens forms a real image 60 cm from the lens. A. Find the focal length of the lens. B. If the object is 9.75 cm high, how high is the image?

48. What is the refractive index of a material in which the speed of light is 1.85 x 10 ^8 m/s ? (remember that the speed of ALL electromagnetic waves in a vacuum is 3 x 10^8)

49. A man in a boat shines a light at a friend under the water. If the beam in the water makes an angle of 36.2 degrees relative to the normal, what was the angle of incidence? (n= 1.33 for water)

50. Define index of refraction

51. A transparent material with at least one curved side is a _____.

52. _____ is the distance between the principe focus of a lens and its optical center or vertex. (f)

53. _____ is the height of the image projected on a screen

54. _____ is the actual height of an object.

55. _____ is the distance of the object from the optical center of the lens.

56. Snell's law_____

57. Define crest, trough, compressions, frequency, Hertz, amplitude, rarefraction, mechanical wave, medium, transverse wave, compression wave.

58. How is the transfer of energy different in a transverse wave vs. a compression wave?
59. Identify the symbols and units for velocity = wavelength x frequency equation.

60. The principle of superposition states that_____

61. Define and give an example of: refraction, damping, reflection, diffraction, standing wave, law of reflection, resonance, decibel

62. What happens when a wave passes from a less dense to a more dense medium.

63. Give 3 examples of transverse waves and compressional waves.

64. Why did Tacoma Narrows Bridge collapse?

65. If the f of a wave is 4 waves per second, what is its period?

66. A sound wave has a f of 264 Hz and travels through air at a temp. of 22 degrees Celsius. What is its wavelength?

67. What is the period of the wave in #66?

68. The speed of sound travels faster in (solids, liquids, gasses)?

69. Define: Mach 1, acoustics, Doppler effect, pitch, red shift, blue shift, electromagnetic wave photon

70. List the electromagnetic spectrum in order of increasing frequency.

71. Explain how the Doppler effect shows us the universe is expanding.

72. The speed of sound increases about _____ m/s for every 1 degree rise in Celsius temperature.

73. Which color has more energy, red or green? Explain.

74. Which wave has a greater wavelength, radio or gamma? Which one as a greater f?

75. Define: static electricity, electroscope, coulomb, electric field, conductor, insulator

76. An electrostatic charge of 20 uC is placed at a distance in air 10.0 cm from a second charge. The force of attraction between them is 22 N. Calculate the magnitude of the second charge.

77. A pith ball carries a charge of -2.2 uC. How many excess electrons does this represent?

78. A pith ball with an excess charge of +5.0 uC is placed 10.0 cm from another pith ball which carries a charge of -4.5uC. What is the amount of the force between them? Is this an attractive or repulsive force?

79. Define Ohm's law, Voltage, current, resistance, amps, volts, ohms

80. Define magnetism- understand what causes magnetic domains and that same poles repel and like poles attract.