Exam #4 ---- (heat transfer, waves, sound, music, etc.)

73. In general, when a liquid is heated
A. it will neither expand nor contract.
B. it will expand at a greater rate than a solid.
C. it will expand at a lesser rate than a solid.
D. it will contract at a greater rate than a solid.
E. it will contract at a lesser rate than a solid.

74. If a flat metal plate with a circular hole cut through it is heated,
A. the hole gets smaller.
B. the hole gets larger.
C. the hole stays exactly the same size.
D. the hole may get larger or smaller, depending on the material of the plate.
E. the hole may get larger or smaller, depending on how much the plate is heated.

75. Water has a higher specific heat capacity than iron. This means that
A. water is more dense than iron.
B. water is hotter than iron.
C. water heats more rapidly than iron.
D. water heats more slowly than iron.
E. water boils at a higher temperature than iron.

76. The specific heat capacity of water is 1 calorie per gram per degree Celsius. This means that it will take _____ calorie(s) to increase the temperature of 10 grams of water by 10 degrees.
A. 20
B. 0.1
C. 1
D. 10
E. 100

77. Water reaches its highest density at a temperature of _____ degrees Celsius.
A. 0
B. 4
C. 10
D. -10
E. -4

78. Which of these is an example of heat transfer by conduction?
A. The handle of a metal spoon becomes hot when you use it to stir a pot of soup on the stove.

B. The air near the ceiling is normally warmer than air near the floor.
C. You can boil water in a microwave oven.
D. You feel the heat from a bonfire even though you are several meters away from it.
E. Smoke rises up a chimney.

79. Rising air tends to
A. expand and become cooler.
B. expand and become warmer.
C. become denser and warmer.
D. become denser and cooler.
E. maintain a constant density and temperature.

80. Radiation is heat transfer by
A. molecular and electronic collisions.
B. electromagnetic waves.
C. bulk fluid motions.
D. atmospheric currents.
E. direct contact.

81. The pattern formed by overlapping waves in a bow wave is in the shape of the letter
__ .
A. B
B. U
C. V
D. I
E. T

82. The Doppler effect causes
A. the observed pitch of a sound to be lower if the source of sound is approaching the observer.
B. the observed pitch of a sound to be higher if the source of sound is moving away from the observer.
C. the observed pitch of a sound to be lower if the source of sound is moving away from the observer.
D. the speed of sound to increase if the source of sound is moving away from the observer.
E. the speed of sound to decrease if the source of sound is moving away from the observer.

83. In a _____ wave, the medium vibrates in a direction that is perpendicular to the direction the wave travels.
A. sound

B. longitudinal
C. perpendicular
D. transverse
E. normal

84. The period of a pendulum depends on
A. the mass of the pendulum and the size of the arc it swings through.
B. the length of the pendulum and the size of the arc it swings through.
C. the mass of the pendulum and the acceleration of gravity.
D. the length of the pendulum and the acceleration of gravity.
E. the weight of the pendulum and the material it is made from.

85. A wave that has a relatively long wavelength will also have a relatively
A. high frequency.
B. long period.
C. large amplitude.
D. high speed.
E. small amplitude.

86. A train of freight cars, each 10 m long, rolls by at the rate of 2 cars each second. What is the speed of the train?
A. 10 m/s
B. 2 m/s
C. 5 m/s
D. 20 m/s
E. 12 m/s

87. Compared to a 500-Hz sound, a 300-Hz sound would have
A. a longer wavelength and the same speed.
B. a longer wavelength and a lower speed.
C. a longer wavelength and a higher speed.
D. a shorter wavelength and a lower speed.
E. a shorter wavelength and the same speed.

88. A vibrating string is being tuned to match a tuning fork with a frequency of 256 Hz. When 3 beats per second are heard, the vibration frequency of the string must be
A. 256 Hz.
B. 253 Hz.
C. 259 Hz.
D. either 253 or 259 Hz.
E. 3 Hz.

89. Constructive interference of sound waves occurs
A. whenever there is an echo.
B. when two waves arrive at the same point in phase with each other.
C. when two waves arrive at the same point out of phase with each other.
D. whenever sound waves are refracted by air layers of different temperatures.
E. whenever sound waves are reflected off distant buildings.

90. Pushing a person on a swing at the same rate as the natural frequency of the swing/
pendulum is an example of
A. destructive interference.
B. constructive interference.
C. resonance.
D. the Doppler effect.
E. refraction.

91. Sound travels faster in air at
A. lower temperatures because the molecules move faster and collide more frequently.
B. lower temperatures because the molecules are closer together and collide more frequently.
C. higher temperatures because the molecules move faster and collide more frequently.
D. higher temperatures because the molecules are closer together and collide more frequently.
E. lower temperatures because the air is more solid then.

92. An intensity of 60 decibels is ____ times as intense as an intensity of 30 decibels.
A. 2
B. 30
C. 60
D. 90
E. 1000

93. The "highness" or "lowness" of a musical tone is called the _____ .
A. loudness
B. rhythm
C. scale
D. pitch
E. intensity

94. Partial tones whose frequencies are whole number multiples of the fundamental frequency are called
A. noise.
B. integers.

C. radicals.
D. harmonics.
E. tonics.

95. When a guitar string vibrates at the frequency of its third harmonic, it will have a node at each end and _____ in between.
A. no nodes
B. one node
C. two nodes
D. three nodes
E. four nodes