Mr. Klansek Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_ Block: \_\_\_\_\_\_

Wave Study Guide

1. The motion of a metronome is an example of simple \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ motion.

2. Simple harmonic motion is vibration about an equilibrium position in which a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force is proportional to the displacement from equilibrium.

3. In the equation for Hooke’s Law, *Felastic* = –*kx*, the term *k* represents the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a spring.

4. The velocity of the bob on a swinging pendulum reaches a maximum when the bob is in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ position.

5. At what position in the cycle of a swinging pendulum is the potential energy of the pendulum at a maximum?

6. At what position of an oscillating mass-spring system does the kinetic energy of the mass reach a maximum?

7. In an oscillating mass-spring system, the restoring force is a result of the force exerted by the spring. What causes the restoring force in a swinging pendulum?

8. If a spring is stretched from a displacement of 10 cm to a displacement of 30 cm, the force exerted by the spring increases by a factor of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

9. How is the relationship between period and frequency represented as an equation?

10. Suppose that a pendulum has a period of 4.0 s at Earth’s surface. If the pendulum is taken to the moon, where the acceleration due to gravity is much less than on Earth, will the pendulum’s period increase, decrease, or stay the same? Explain your answer.

11. Electromagnetic waves can move through empty space, but mechanical waves require a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through which to travel.

12. Suppose longitudinal waves are generated in a long spring. Describe the motion of a particle within the spring.

13. Describe the motion of a particle in a rope through which a transverse wave is passing.

14. A boat produces a wave as it passes an aluminum can floating in a lake. Explain why the can is not moved along in the direction of wave motion.

15. What is the difference between a pulse wave and a periodic wave?



16. In the waveform shown above, which feature of a wave does letter D represent?

17. In the waveform shown above, which feature of a wave does letter C represent?

18. In the transverse waveform shown above, the feature designated by letter B corresponds to a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a longitudinal wave.

19. What feature of a wave increases when the source of vibration increases in energy?

20. In a mechanical wave, what is the relationship between the energy and the wave’s amplitude?

21. A student observes two pulses on a rope wave meet and temporarily form a wave with a greater amplitude than either of the two waves alone. The student has observed an example of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ interference.

22. Two pulses of equal but opposite amplitudes meet on a rope. Describe the appearance of the rope at the instant when the two pulses coincide completely.

23. A standing wave is created in a certain string. Certain points on the string do not appear to be vibrating, but instead seem to be standing still. These points are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

24. Cicadas produce a sound that has a frequency of 123 Hz. What is the wavelength of this sound in the air? The speed of sound in air is 334 m/s.

25. A nineteenth-century fisherman’s cottage in England is only 2.54 m long. Suppose a fisherman whistles inside the cottage, producing a note that has a wavelength that exactly matches the length of the house. What is the whistle’s frequency? The speed of sound in air is 334 m/s.

26. The highest-pitched sound that a human ear can detect is about 21 kHz. On the other hand, dolphins can hear ultrasound with frequencies up to 280 kHz. What is the speed of sound in water if the wavelength of ultrasound with a frequency of 2.80 × 105 Hz is 0.510 cm? How long would it take this sound wave to travel to a dolphin 3.00 km away?