

Multiple Choice: Place your answer in the table on **page 2**. – 10 marks

1. Which three wave characteristics depend on one another?
  - (a) amplitude, speed, phase
  - (b) speed, wavelength, frequency
  - (c) amplitude, direction, frequency
  - (d) amplitude, waveform, speed
2. For the speed of sound to be 345 m/s, what must the air temperature be?
  - (a) 8.1 °C
  - (b) 18.1 °C
  - (c) 19.3 °C
  - (d) 22.4 °C
3. When two waves meet, one with amplitude 4 cm and the other with amplitude 2 cm, what are the possible maximum and minimum amplitudes of the resulting wave?
  - (a) maximum 6 cm, minimum 2 cm
  - (b) maximum 4 cm, minimum 2 cm
  - (c) maximum 8 cm, minimum 0.5 cm
  - (d) maximum 6 cm, minimum 6 cm
4. Which statement describes a musical instrument with an air column that is open at both ends?
  - (a) Antinodes are at both ends of the column.
  - (b) The fundamental frequency occurs with the highest frequency and longest wavelength.
  - (c) The fundamental frequency occurs when the length of the instrument equals the wavelength.
  - (d) Nodes are at both ends of the column.
5. A 33 cm long violin string vibrates with a fundamental frequency of 196 Hz. If the violinist presses against the fingerboard 4 cm from the end of the string, what is the new fundamental frequency?
  - (a) 172 Hz
  - (b) 192 Hz
  - (c) 196 Hz
  - (d) 223 Hz
6. Which phrase best describes damping of a wave?
  - (a) decreased velocity
  - (b) constructive interference
  - (c) decreased frequency
  - (d) decreased amplitude
7. A hypersonic test glider achieved a speed of Mach 20 before crashing. This means that the glider traveled
  - (a) at 20 times the speed of sound
  - (b) at 20 m/s
  - (c) at 2 times the speed of sound
  - (d) at 1/20 the speed of sound
8. Which best describes sound waves?
  - (a) transfer of energy from one place to another
  - (b) transfer of mass from one place to another
  - (c) positive displacement of particles
  - (d) movement in a direction perpendicular to the direction of the wave
9. If the frequency of a wave is 300 Hz and the wavelength is 1.5 m, what is the speed of the wave?
  - (a) 0.005 m/s
  - (b) 200 m/s
  - (c) 300 m/s
  - (d) 450 m/s
10. Which of the following frequencies is a higher harmonic of a string with a fundamental frequency of 150 Hz?
  - (a) 200 Hz
  - (b) 300 Hz
  - (c) 400 Hz
  - (d) 500 Hz

