McRoberts Secondary

Waves Unit Test 2025-01-22

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1 1
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In this section **no** changes or modifications must be made!

Scrambling 0 0

Type: 025

Exam ID(Physics 11): 25012200004

Please mark the boxes carefully: ☒ Not marked: ☐ or ■

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Only clearly marked and positionally accurate crosses will be processed!

Answers 1 - 15

	a	b	c	d
1	☐	☐	☐	☐
2	☐	☐	☐	☐
3	☐	☐	☐	☐
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9	☐	☐	☐	☐
10	☐	☐	☐	☐
11	☐	☐	☐	☐
12	☐	☐	☐	☐
13	☐	☐	☐	☐
14	☐	☐	☐	☐
15	☐	☐	☐	☐
	a	b	c	d

Answers 16 - 25

	a	b	c	d
16	☐	☐	☐	☐
17	☐	☐	☐	☐
18	☐	☐	☐	☐
19	☐	☐	☐	☐
20	☐	☐	☐	☐
21	☐	☐	☐	☐
22	☐	☐	☐	☐
23	☐	☐	☐	☐
24	☐	☐	☐	☐
25	☐	☐	☐	☐
	a	b	c	d

1. Which unit is used to measure frequency?
    a. metres per second (m/s)
    b. hertz (Hz)
    c. seconds per metre (s/m)
    d. second (s)
2. The shortest distance between two points on a wave where the wave pattern is repeated is the
    a. period
    b. amplitude
    c. frequency
    d. wavelength
3. The change in the direction of waves at the boundary between two different media is
    a. resonance
    b. diffraction
    c. superposition
    d. refraction
4. In a standing wave on a string, nodes are points where
    a. maximum displacement occurs
    b. energy is lost
    c. the wave is reflected
    d. no displacement occurs
5. When a wave enters a medium in which its speed decreases, which change must occur?
    a. frequency increases
    b. frequency decreases
    c. wavelength increases
    d. wavelength decreases
6. What does the speed of a mechanical wave depend on? **Select all that apply.**
    a. amplitude
    b. wavelength
    c. properties of the medium
    d. energy of the wave
7. Which of the following does **not** describe the pitch of a sound?
    a. a musical note
    b. high or low
    c. loud or soft
    d. frequency of vibration
8. A wave travels from a more-dense medium into a less-dense medium. Which quantities must be greater for the transmitted wave than for the incident wave? **Select all that apply.**
    a. wavelength
    b. frequency
    c. speed
    d. period

9. When a wave travels from one medium to another, which properties must be the same for both the incident and transmitted waves? **Select all that apply.**

    a. frequency
    b. wavelength
    c. period
    d. speed

10. A 769 Hz pure tone is played at the same time as a 616 Hz pure tone. What beat frequency will be produced?

    a. 170 Hz
    b. 204 Hz
    c. 153 Hz
    d. 188 Hz

11. A student has two tuning forks, one with a frequency of 586 Hz and the other with frequency unknown. When struck together, the tuning forks produce 12 beats per second. What are the possible frequencies of the unknown tuning fork? **Select all that apply**.

    a. 562 Hz
    b. 586 Hz
    c. 49 Hz
    d. 574 Hz

12. What is the decibel level of a sound that has an intensity of $3.1 \times 10^{-1}\,\mathrm{W/m^2}$?

    a. 85 dB
    b. 129 dB
    c. 115 dB
    d. 162 dB

13. What is the intensity of a 91 dB sound?

    a. 1.29E-04 $\mathrm{W/m^2}$
    b. 1.26E-03 $\mathrm{W/m^2}$
    c. 1.78E-02 $\mathrm{W/m^2}$
    d. 1.48E-04 $\mathrm{W/m^2}$

14. How many times more intense is a 105 dB sound than a 80 dB sound?

    a. 34.8
    b. 320
    c. 188
    d. 2.4E+03

15. A sonar signal (sound wave) is emitted from a submarine and returns $0.335\,\mathrm{s}$ later. The speed of sound in water is $1497\,\mathrm{m/s}$. How far away is the object that reflected the sonar signal?

    a. $465\,\mathrm{m}$
    b. $501\,\mathrm{m}$
    c. $183\,\mathrm{m}$
    d. $251\,\mathrm{m}$

16. A parked car emits an alarm sound with a frequency of 2031 Hz. If the speed of sound in air is 341 m/s, what frequency will an observer hear while driving toward the parked car at a speed of 19 m/s?

    a. 1490 Hz
    b. 1790 Hz
    c. 2140 Hz
    d. 1260 Hz

17. A car horn emits a frequency of 485 Hz when the car is stationary. If the speed of sound in air is 330 m/s, what frequency will an observer hear as the car is approaching at a speed of 7 m/s while the horn is sounding?

    a. 707 Hz
    b. 496 Hz
    c. 654 Hz
    d. 314 Hz

18. What frequency is a major third above 891 Hz?

    a. 1110 Hz
    b. 555 Hz
    c. 946 Hz
    d. 684 Hz

19. What frequency is 11 semitones above 171 Hz?

    a. 284 Hz
    b. 323 Hz
    c. 215 Hz
    d. 250 Hz

20. A wave has a frequency of $18.7\,\text{Hz}$. What is its period?

    a. $0.0535\,\text{s}$
    b. $0.0654\,\text{s}$
    c. $0.0788\,\text{s}$
    d. $0.0712\,\text{s}$

21. A wave has a wavelength of $19\,\text{cm}$ and a frequency of $59\,\text{Hz}$. What is its speed?

    a. $8.69\,\text{m/s}$
    b. $11.2\,\text{m/s}$
    c. $370\,\text{m/s}$
    d. $1120\,\text{m/s}$

22. A wave has a frequency of $48\,\text{Hz}$ and a speed of $76\,\text{m/s}$. What is its wavelength?

    a. $1.58\,\text{m}$
    b. $3650\,\text{m}$
    c. $955\,\text{m}$
    d. $1130\,\text{m}$

23. The distance between the two fixed ends of a piece of string is $0.757\,\mathrm{m}$. When the string is vibrating at harmonic number 5, the frequency is $1259\,\mathrm{Hz}$. What is the speed of the waves on the string?

    a. $234\,\mathrm{m/s}$
    b. $535\,\mathrm{m/s}$
    c. $278\,\mathrm{m/s}$
    d. $381\,\mathrm{m/s}$

24. One organ pipe has a length of 2.0 m. A second pipe should have a pitch one major seventh higher. The pipe should be how long?

    a. 0.818 m
    b. 1.07 m
    c. 1.44 m
    d. 1.57 m

25. What is the wavelength of harmonic number 5 in a closed-pipe resonator of length 1.38 m?

    a. 0.96 m
    b. 0.6 m
    c. 1.1 m
    d. 1.37 m