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): 25012200003

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	☐	☐	☐	☐
4	☐	☐	☐	☐
5	☐	☐	☐	☐
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8	☐	☐	☐	☐
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. seconds per metre (s/m)
    b. metre (m)
    c. metres per second (m/s)
    d. hertz (Hz)
2. The shortest distance between two points on a wave where the wave pattern is repeated is the
    a. wavelength
    b. wave pulse
    c. frequency
    d. period
3. When waves spread out around the edge of a barrier, _____ occurs.
    a. interference
    b. diffraction
    c. rarefaction
    d. resonance
4. In a standing wave on a string, nodes are points where
    a. maximum displacement occurs
    b. no displacement occurs
    c. energy is lost
    d. the wave is reflected
5. When a wave enters a medium in which its speed increases, 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. energy of the wave
    c. properties of the medium
    d. frequency
7. Which of the following does **not** describe the pitch of a sound?
    a. loud or soft
    b. high or low
    c. frequency of vibration
    d. a musical note
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. frequency
    b. period
    c. wavelength
    d. speed

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 195 Hz pure tone is played at the same time as a 785 Hz pure tone. What beat frequency will be produced?

    a. 332 Hz
    b. 738 Hz
    c. 590 Hz
    d. 798 Hz

11. A student has two tuning forks, one with a frequency of 130 Hz and the other with frequency unknown. When struck together, the tuning forks produce 18 beats per second. What are the possible frequencies of the unknown tuning fork? **Select all that apply**.

    a. 7 Hz
    b. 148 Hz
    c. 94 Hz
    d. 166 Hz

12. What is the decibel level of a sound that has an intensity of $3.1 \times 10^{-3}\,\mathrm{W/m^2}$?

    a. 95 dB
    b. 65 dB
    c. 84 dB
    d. 52 dB

13. What is the intensity of a 77 dB sound?

    a. 1.12E-04 $\mathrm{W/m^2}$
    b. 5.01E-05 $\mathrm{W/m^2}$
    c. 1.15E-04 $\mathrm{W/m^2}$
    d. 2.51E-05 $\mathrm{W/m^2}$

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

    a. 203
    b. 320
    c. 248
    d. 119

15. A sonar signal (sound wave) is emitted from a submarine and returns $0.0826\,\mathrm{s}$ later. The speed of sound in water is $1413\,\mathrm{m/s}$. How far away is the object that reflected the sonar signal?

    a. $29.4\,\mathrm{m}$
    b. $117\,\mathrm{m}$
    c. $36.8\,\mathrm{m}$
    d. $58.4\,\mathrm{m}$

16. A parked car emits an alarm sound with a frequency of 1146 Hz. If the speed of sound in air is 354 m/s, what frequency will an observer hear while driving away from the parked car at a speed of 18 m/s?

    a. 1400 Hz
    b. 566 Hz
    c. 913 Hz
    d. 1090 Hz

17. A car horn emits a frequency of 422 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 30 m/s while the horn is sounding?

    a. 397 Hz
    b. 519 Hz
    c. 464 Hz
    d. 654 Hz

18. What frequency is a major sixth above 484 Hz?

    a. 510 Hz
    b. 720 Hz
    c. 807 Hz
    d. 410 Hz

19. What frequency is 4 semitones above 852 Hz?

    a. 851 Hz
    b. 1073 Hz
    c. 722 Hz
    d. 546 Hz

20. A wave has a period of $7.92\,\text{seconds}$. What is its frequency?

    a. $0.173\,\text{Hz}$
    b. $0.14\,\text{Hz}$
    c. $0.126\,\text{Hz}$
    d. $0.113\,\text{Hz}$

21. A wave has a wavelength of $63\,\text{cm}$ and a frequency of $20\,\text{Hz}$. What is its speed?

    a. $1260\,\text{m/s}$
    b. $12.6\,\text{m/s}$
    c. $9.9\,\text{m/s}$
    d. $8.07\,\text{m/s}$

22. A wave has a frequency of $23\,\text{Hz}$ and a speed of $44\,\text{m/s}$. What is its wavelength?

    a. $1010\,\text{m}$
    b. $1.04\,\text{m}$
    c. $1.91\,\text{m}$
    d. $1.29\,\text{m}$

23. A tuning fork has a frequency of 400 Hz. The fork causes resonances in an air column spaced at 46.1 cm. What is the speed of the sound?

    a. 464 m/s
    b. 244 m/s
    c. 369 m/s
    d. 539 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. 1.07 m
    b. 0.711 m
    c. 1.42 m
    d. 0.828 m

25. What is the wavelength of harmonic number 1 in an open-pipe resonator of length 0.69 m?

    a. 1.61 m
    b. 1.02 m
    c. 1.39 m
    d. 1.81 m