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): 25012200002

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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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. hertz (Hz)
    b. seconds per metre (s/m)
    c. second (s)
    d. metre (m)
2. The number of repeating cycles per second is the
    a. wave pulse
    b. amplitude
    c. frequency
    d. period
3. When waves spread out around the edge of a barrier, _____ occurs.
    a. reflection
    b. diffraction
    c. interference
    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. frequency
    c. properties of the medium
    d. wavelength
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. speed
    b. wavelength
    c. frequency
    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. wavelength
    b. speed
    c. period
    d. frequency

10. A 541 Hz pure tone is played at the same time as a 321 Hz pure tone. What beat frequency will be produced?

    a. 220 Hz
    b. 304 Hz
    c. 273 Hz
    d. 328 Hz

11. A student has two tuning forks, one with a frequency of 728 Hz and the other with frequency unknown. When struck together, the tuning forks produce 4 beats per second. What are the possible frequencies of the unknown tuning fork? **Select all that apply**.

    a. 724 Hz
    b. 732 Hz
    c. 728 Hz
    d. 720 Hz

12. What is the decibel level of a sound that has an intensity of $5.6 \times 10^{-1}\,\mathrm{W/m^2}$?

    a. 142 dB
    b. 175 dB
    c. 154 dB
    d. 117 dB

13. What is the intensity of a 100 dB sound?

    a. 2.14E-02 $\mathrm{W/m^2}$
    b. 3.31E-02 $\mathrm{W/m^2}$
    c. 1.00E-02 $\mathrm{W/m^2}$
    d. 2.29E-03 $\mathrm{W/m^2}$

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

    a. 1.88E+03
    b. 3.07E+04
    c. 1.36E+03
    d. 320

15. A sonar signal (sound wave) is emitted from a submarine and returns $0.14\,\mathrm{s}$ later. The speed of sound in water is $1406\,\mathrm{m/s}$. How far away is the object that reflected the sonar signal?

    a. $98.4\,\mathrm{m}$
    b. $131\,\mathrm{m}$
    c. $154\,\mathrm{m}$
    d. $66.2\,\mathrm{m}$

16. A parked car emits an alarm sound with a frequency of 2125 Hz. If the speed of sound in air is 337 m/s, what frequency will an observer hear while driving away from the parked car at a speed of 26 m/s?

    a. 1480 Hz
    b. 1120 Hz
    c. 1740 Hz
    d. 1960 Hz

17. A car horn emits a frequency of 455 Hz when the car is stationary. If the speed of sound in air is 339 m/s, what frequency will an observer hear as the car is approaching at a speed of 14 m/s while the horn is sounding?

    a. 312 Hz
    b. 256 Hz
    c. 422 Hz
    d. 475 Hz

18. What frequency is a major second above 256 Hz?

    a. 257 Hz
    b. 288 Hz
    c. 382 Hz
    d. 346 Hz

19. What frequency is 10 semitones above 335 Hz?

    a. 827 Hz
    b. 894 Hz
    c. 597 Hz
    d. 728 Hz

20. A wave has a frequency of $90.5\,\text{Hz}$. What is its period?

    a. $0.0123\,\text{s}$
    b. $0.011\,\text{s}$
    c. $0.0149\,\text{s}$
    d. $0.0164\,\text{s}$

21. A wave has a wavelength of $18\,\text{cm}$ and a frequency of $60\,\text{Hz}$. What is its speed?

    a. $907\,\text{m/s}$
    b. $8.2\,\text{m/s}$
    c. $613\,\text{m/s}$
    d. $10.8\,\text{m/s}$

22. A wave has a wavelength of $32\,\text{m}$ and a speed of $72\,\text{m/s}$. What is its frequency?

    a. $0.444\,\text{Hz}$
    b. $2170\,\text{Hz}$
    c. $474\,\text{Hz}$
    d. $2.25\,\text{Hz}$

23. A tuning fork has a frequency of 389 Hz. The fork causes resonances in an air column spaced at 49.8 cm. What is the speed of the sound?

    a. 257 m/s
    b. 344 m/s
    c. 387 m/s
    d. 200 m/s

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

    a. 1.33 m
    b. 1.17 m
    c. 1.91 m
    d. 1.71 m

25. What is the wavelength of harmonic number 6 in an open-pipe resonator of length 1.06 m?

    a. 0.307 m
    b. 0.353 m
    c. 0.184 m
    d. 0.512 m