McRoberts Secondary

Waves Unit Test 2025-01-22

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Registration Number

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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): 25012200001

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

10. A 779 Hz pure tone is played at the same time as a 223 Hz pure tone. What beat frequency will be produced?

    a. 556 Hz
    b. 356 Hz
    c. 679 Hz
    d. 736 Hz

11. A student has two tuning forks, one with a frequency of 481 Hz and the other with frequency unknown. When struck together, the tuning forks produce 19 beats per second. What are the possible frequencies of the unknown tuning fork? **Select all that apply**.

    a. 443 Hz
    b. 519 Hz
    c. 462 Hz
    d. 500 Hz

12. What is the decibel level of a sound that has an intensity of $9.1 \times 10^{0}\,\mathrm{W/m^2}$?

    a. 113 dB
    b. 130 dB
    c. 66 dB
    d. 100 dB

13. What is the intensity of a 46 dB sound?

    a. 1.45E-05 $\mathrm{W/m^2}$
    b. 3.98E-08 $\mathrm{W/m^2}$
    c. 1.38E-07 $\mathrm{W/m^2}$
    d. 1.51E-05 $\mathrm{W/m^2}$

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

    a. 33.2
    b. 100
    c. 262
    d. 320

15. A sonar signal (sound wave) is emitted from a submarine and returns $0.459\,\mathrm{s}$ later. The speed of sound in water is $1482\,\mathrm{m/s}$. How far away is the object that reflected the sonar signal?

    a. $680\,\mathrm{m}$
    b. $340\,\mathrm{m}$
    c. $178\,\mathrm{m}$
    d. $257\,\mathrm{m}$

16. A parked car emits an alarm sound with a frequency of 2628 Hz. If the speed of sound in air is 335 m/s, what frequency will an observer hear while driving toward the parked car at a speed of 30 m/s?

    a. 3610 Hz
    b. 1570 Hz
    c. 2860 Hz
    d. 2060 Hz

17. A car horn emits a frequency of 471 Hz when the car is stationary. If the speed of sound in air is 347 m/s, what frequency will an observer hear as the car is approaching at a speed of 5 m/s while the horn is sounding?

    a. 311 Hz
    b. 672 Hz
    c. 478 Hz
    d. 368 Hz

18. What frequency is a major sixth above 435 Hz?

    a. 725 Hz
    b. 458 Hz
    c. 636 Hz
    d. 551 Hz

19. What frequency is 11 semitones above 545 Hz?

    a. 1029 Hz
    b. 1497 Hz
    c. 701 Hz
    d. 580 Hz

20. A wave has a period of $8.69\,\text{seconds}$. What is its frequency?

    a. $0.15\,\text{Hz}$
    b. $0.0722\,\text{Hz}$
    c. $0.133\,\text{Hz}$
    d. $0.115\,\text{Hz}$

21. A wave has a wavelength of $11\,\text{cm}$ and a frequency of $10\,\text{Hz}$. What is its speed?

    a. $0.616\,\text{m/s}$
    b. $1.1\,\text{m/s}$
    c. $0.787\,\text{m/s}$
    d. $0.972\,\text{m/s}$

22. A wave has a frequency of $17\,\text{Hz}$ and a speed of $34\,\text{m/s}$. What is its wavelength?

    a. $1.4\,\text{m}$
    b. $2\,\text{m}$
    c. $220\,\text{m}$
    d. $354\,\text{m}$

23. The distance between the two fixed ends of a piece of string is $0.669\,\mathrm{m}$. When the string is vibrating at harmonic number 5, the frequency is $1927\,\mathrm{Hz}$. What is the speed of the waves on the string?

    a. $260\,\mathrm{m/s}$
    b. $317\,\mathrm{m/s}$
    c. $516\,\mathrm{m/s}$
    d. $459\,\mathrm{m/s}$

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

    a. 0.865 m
    b. 1 m
    c. 1.16 m
    d. 1.34 m

25. What is the wavelength of harmonic number 9 in a closed-pipe resonator of length 1.7 m?

    a. 0.756 m
    b. 1 m
    c. 0.915 m
    d. 0.837 m