

Crave The Wave Key

by - oliviaeee#2842

Speed of light -  $3 \cdot 10^8$  m/s

Speed of sound - 343 m/s

Plank's Constant -  $6.62607 \cdot 10^{-34}$  m<sup>2</sup> kg/s

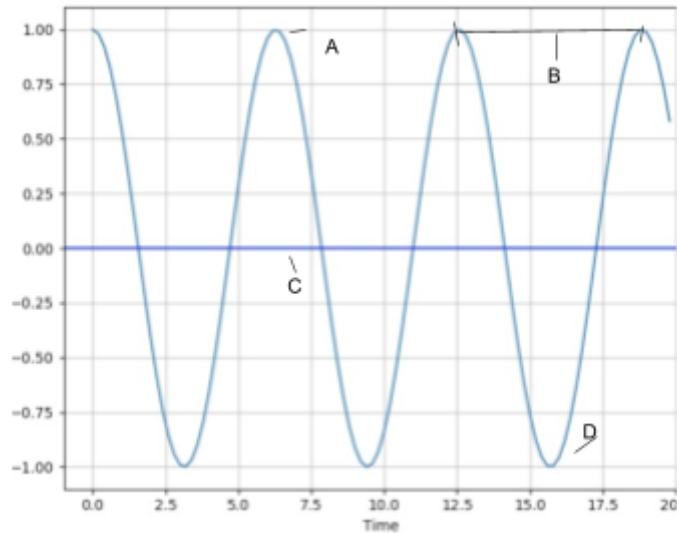
Round answer to nearest 100th unless specified otherwise

Message aeee#2842 to give criticism / corrections !!

SCORE

/120

Refer to the following image for questions 1-7



1. What type of waveform is this? (3 pts)

Cosine wave

2. What part of a wave is A? (1pt)

Crest

3. What part of a wave is B? (1pt)

Wavelength

4. What part of a wave is C? (1pt)

Equilibrium / normal

5. What part of a wave is D? (1pt)

Trough

6. How many wavelengths apart are points A and D? (2pts)

1.5 wavelengths

7. What is the period of this wave (approximately)? (2pts)

Anything from 5-5.5s

8. What type of medium does a mechanical wave travel slowest in? (2pts)

- a. solids
- b. liquids
- c. gasses X
- d. Vacuum

9. Paganini is playing the piano. What type of wave does the sound produce? (1pt)

- a. longitudinal waves X
- b. transverse waves
- c. torsional waves
- d. surface waves

10. I swing a rope up and down while my other friend holds the rope down. What type of wave does the rope produce? (1pt)

- a. longitudinal waves
- b. transverse waves
- c. torsional waves
- d. surface waves

True False (1pt per question)

- 11. A longitudinal wave moves parallel to wave propagation. (T/F) T
- 12. Total internal reflection only takes place when  $n_1 < n_2$ . (T/F) F
- 13. Inferior mirages are caused when the ground is hot and the air is cool. (T/F) T
- 14. Blue light bends more compared to red light. (T/F) T
- 15. The decibel scale is logarithmic. (T/F) T
- 16. The higher the frequency, the lower the pitch of a sound wave. (T/F) F
- 17. There are approximately 10,000 earthquakes yearly. (T/F) F
- 18. Frequency isn't changed when crossing a boundary (T/F) T
- 19. A fiber optics cable is about the thickness of a fingernail (T/F) F
- 20. Laser stands for Light Amplification by Stimulated Emission Rays (T/F) F
- 21. A Love wave arrives first at a seismograph station (T/F) F

SECTION 2 - Multiple Choice (2pt per question)

22. Austrian physicist Christian Doppler discovered the Doppler effect in what year?

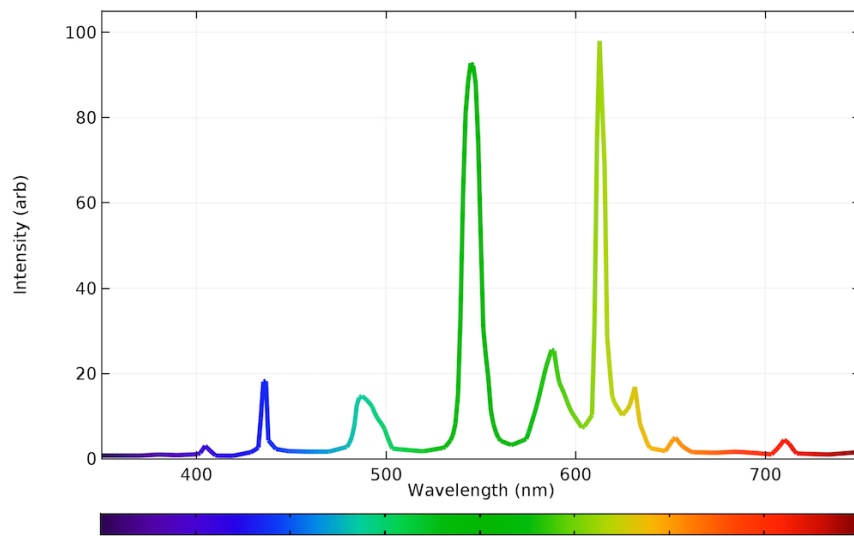
- a. 1842 X
- b. 1794
- c. 1921
- d. 1895

23. What does AM stand for?

- a. Angular modulation
- b. Acoustic modulation
- c. Amplitude modulation x
- d. Absorption modulation

24. Select the ionizing radiations (can choose multiple answers)

- a. gamma rays x
- b. near infrared
- c. visible
- d. Soft x-rays x
- e. far infrared



25. What type of spectra is shown above?

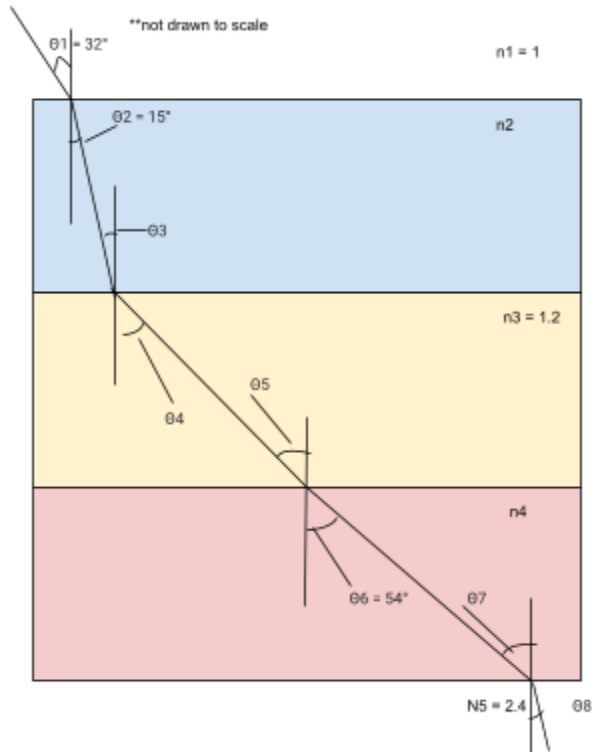
- a. emission spectra x
- b. absorption spectra
- c. molecular spectra
- d. continuous spectra

### SECTION 3 - Open Ended

26. What is the difference between echo and reverberation? (4pt)

An echo is a distinct reflection of noise (2pt) whereas a reverb is when a sound wave bounces off multiple surfaces and reflect the same noise multiple times, making it sound "muddy" (2pt)

A wave with the wavelength of 3.42nm travels and refracts through 3 mediums. For questions 27-30 reference to the image below



27. What is the index of refraction of  $n_2$ ? (4pt)

2.05

28. What is the angle of  $\theta_4$ ? (4pt)

26.2°

29. What is the speed of light in  $n_4$ ? (5pt)

422865953.19 m/s

30. What is the angle of  $\theta_8$ ? (4pt)

13.84°

31. What is the speed of light? (not approximated) (3pt)

299,792,458 m/s

32. What is the shadow zone? (4pt)

The shadow zone is an area of the earth's surface where seismographs cannot detect direct P and/or S waves from an earthquake.

33. Referencing to the shadow zone, beyond angle are S waves not recorded? (4pt)

Roughly  $103^\circ$

34. A star has a peak wavelength of 528 nm. What is its absolute temperature? (in Kelvins) (6pt)

5639.58K

35. What is ionizing radiation? (4pt)

A form of energy that acts by removing electrons from atoms and molecules of materials.

36. What is the compliment of red light? (2pt)

Cyan

37. What color does (200, 50, 100) make? (4pt)

Pink / dark-ish pink

38. What color does (40, 85, 50) make? (4pt)

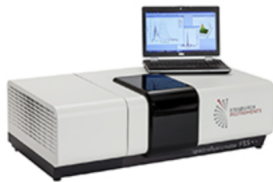
Dark green

39. What color does (250, 125, 50) make? (4pt)

Orange

40. What color(s) does a cyan object absorb and what color(s) does it reflect? (3pt)

Reflects green and blue, absorbs red



41. What spectroscopy instrument is shown above? (4pt)

Optical Spectrometer

42. What is the name of the bridge that famously twisted around in 1940 and what type of wave did the bridge motion replicate? (3pt)

Tacoma Narrows Bridge (2pt), torsional wave (1pt)

43. What is Thermal Doppler Broadening? (4pt)

The spreading of a spectral line due to the temperature of the emitting medium.

44. A bat is flying towards a wall at the constant speed of 100 m/s. The bat emits a sound of 200Hz, which is then reflected back at the bat. Assuming the speed of sound is 343 m/s, what frequency does the bat hear? (8pt)

227.88Hz

45. How much energy and what type of wave is a wave with a frequency of 75THz (6pt)

496.96J (4pt), infrared (2pt)