

2nd Prep. Feb. revision



(1) Write the scientific term:

- 1- It is a motion which is regularly repeated in equal periods of time. ()
- 2- It is the motion of oscillating body around its rest point, where the motion is repeated through equal intervals of time. ()
- 3- It is the maximum displacement done by the oscillating body away from its original position. ()
- 4- It is the motion of an oscillating body when it passes by a fixed point on its path two successive times in the same direction. ()
- 5- It is the time taken by an oscillating body to make one complete oscillation. ()
- 6- It is number of complete oscillations made by an oscillating body in one second. ()
- 7- It is the disturbance that propagates and transfers energy in the direction of propagation. ()
- 8- It is the motion produced as a result of the vibration of the medium particles at a certain moment and in a definite direction. ()
- 9- It is the direction through which the wave propagates. ()
- 10- It is a disturbance in which the particles of the medium vibrate perpendicular to the direction of wave propagation. ()
- 11- It is the highest point of the particles of the medium in the transverse wave. ()

12- It is the lowest point of particles of the medium in the transverse wave.

()

13-It is the area at which the particles of the medium are of highest density and pressure

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14-It is the area at which the medium particles are of lowest density and pressure.

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15- It is the distance between two successive crests or troughs. ()

16-It is the distance between the centers of two successive compressions or rarefactions.

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17-It is the maximum displacement achieved by the medium particles away from their rest positions.

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18- It is the distance covered by the wave in one second. ()

19- It is the number of waves produced from the source in one second.

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20- Simplest form of oscillatory motion.

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(2) Give reason for:

1- The oscillatory motion is considered as a periodic motion.

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2- Water waves are transverse waves.

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3- Sound waves are longitudinal waves.

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4- Sound waves are mechanical waves, while radio waves are electromagnetic waves.

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5- Hearing thunder after seeing lightning though they happen at the same time.

6- We can't hear the sound of solar explosions occurring on the sun, but we can see the light coming out of it.

(3) Compare between each of the following:

1) Mechanical waves and electromagnetic waves

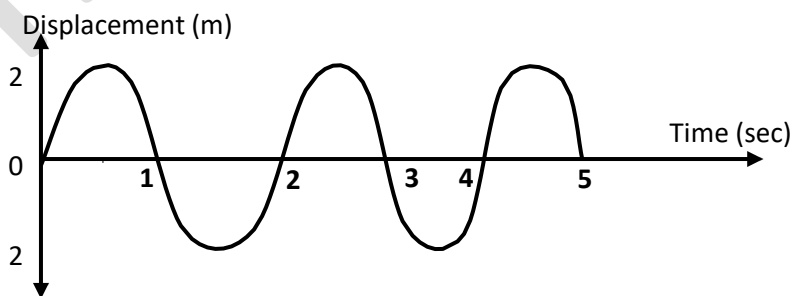
2) Transverse and longitudinal waves.

3) Oscillatory and wave motion.

(4) Problems:

1- From the opposite figure of the oscillatory motion of a simple pendulum, calculate:

- a) Amplitude.
- b) Periodic time.
- c) Frequency.



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2- Calculate the periodic time and frequency for an oscillating body that makes 500 complete oscillations in two minutes.

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3- Calculate the wave length in meter for a visible light wave of frequency 5×10^8 hertz and velocity of 3×10^8 m/s

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4- A longitudinal wave is produced by a spiral spin such that the distance between the first and fourth compression is 24 m find the wave velocity if the frequency of such wave is 20 Hertz.

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5) Calculate the wave length of a sound wave propagating through sea water with velocity 1500 m/sec knowing that its frequency is 100 hertz.

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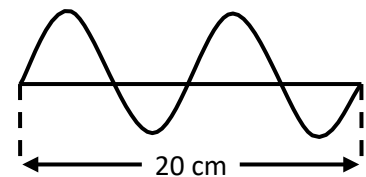
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6) From the opposite figure, calculate the velocity of the wave if its frequency is 25 Hertz.

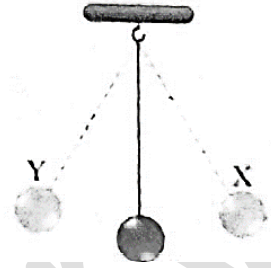
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- 7) From the opposite figure, when the ball of pendulum move from (X) to (Y)
In 0.02 sec . find the frequency .

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.....



(5) What is meant by each of the following?

- 1- The time taken by spring to make 60 complete oscillations is 1 minute.
.....
- 2- The frequency of simple pendulum is 50 Hz.
.....
- 3- Wave length of sound wave is 30 cm.
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- 4- Amplitude of vibrating source is 5 cm.
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Unit 1 Exam

هذا الاختبار يجب عنه الطالب بنفسه
ثم تابع حصة البث المباشر التي
سيعن عنها للحصول على الإجابة

1-A -Choose the correct answer:

1-If the periodic time of an oscillating body is 0.1 sec., so the number of complete oscillations in one minute is

- a. 10 b. 600 c. 120 d. 60

2-All of the following are examples of oscillatory motion, except

- a. motion of a string. c. motion of a tuning fork.
b. motion of a car. d. motion of a simple pendulum.

3-The sound waves arewaves.

- a. mechanical longitudinal c. electromagnetic longitudinal
b. mechanical transverse d. electromagnetic transverse

4- If the distance between the center of the third compression and the center of the fifth compression on the wave propagation is 20 cm, then the wavelength of this wave.....

- a. 40 cm. b. 20 cm. c. 10 cm. d. 5 cm.

B- Give reasons for :

1-Oscillatory motion is considered as a periodic motion.

.....

2-The frequency of the vibrating body decreases by increasing the periodic time.

.....

2- A - What is the importance of ...?

Physiotherapy tubs (jacuzzi).....

B-Put (√) or (X) and correct the wrong ones:

1-The transverse wave is a disturbance that causes the movement of medium particles from their positions ()

2- The velocity of the oscillating body reaches its maximum value when it passes its rest position ()

3-The motion of pendulum which includes 3 complete oscillations, includes 12 amplitudes. ()

4-Wave velocity is constant in the different media. ()

3- A - Write the scientific term of each of the following:

1- Maximum displacement made by the oscillating body away from its rest position. ()

2- The point of the lowest density and pressure in the longitudinal wave. ()

- 3- The periodic motion made by a body around its point of rest, where the motion is repeated through equal intervals of time ()
- 4- The inverse of the frequency. ()

B - What are the results of ..?

1-The increase in the frequency of a wave to double its value with respect to the wavelength when the wave velocity is constant

.....

2-The distance between two successive crests of a transverse wave is doubled.

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C- What's meant by ...?

1- The frequency of a tuning fork is 652 Hz.

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2- The oscillating body makes 540 oscillations in one and a half minute.

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هذا الاختبار يجب عنه الطالب بنفسه ثم تابع
حصة البث المباشر التي سيعلم عنها للحصول

Answers

(1) Write the scientific term:

1- Periodic motion

2- Oscillatory motion

3- Amplitude

4- Complete oscillation

5- Periodic time

6- Frequency

7- Wave

8- Wave motion

9- Line of wave propagation

10- Transverse wave

11- Crest

12- Trough

13- Longitudinal wave

14- Compression

15- Rarefaction

16- Wave length (λ) of transverse wave

17- Wavelength of longitudinal wave

18- Amplitude of wave

19- Wave velocity

20- Wave frequency

21- Simple harmonic motion

(2) Give reason for:

1- Because the motion of oscillating body is repeated through equal intervals of time.

2- Because the water particles vibrate in a direction perpendicular to the direction of wave propagation.

3- Because the medium (air) particles vibrate along the direction of waves propagation.

4- Because sound wave need a medium to propagate and they don't propagate through vacuum while radio waves don't need medium to propagate.

5- Because the light of lightning is from electromagnetic waves, while the sound of thunder is mechanical waves, where the speed of electromagnetic waves is much greater than the speed of mechanical

6- Because the sound is mechanical waves which need a medium to propagate through while the light is electromagnetic waves which can propagate through vacuum.

(3) Compare between:

1) Mechanical waves and electromagnetic waves.

Mechanical	Electromagnetic
1- They need medium to propagate.	2- They do not need medium to propagate.
2- They don't propagate through vacuum (free space)	2- They propagate through vacuum (free space)
3- They are transverse waves or longitudinal waves.	3- They are all transverse waves.
4- Their speed is relatively low. Examples: sound waves (longitudinal) – water waves (transverse)	4- Their speed is great the speed of light = 3×10^8 m/sec Examples: light waves – radio waves (used in radars)

Point of comparison	transverse	Longitudinal
1- Definition	It is a disturbance in which the particles of medium vibrate perpendicular to the direction of wave propagation.	It is a disturbance in which the particles of medium vibrate along the direction of wave propagation.
2- Composition	crests and troughs	compressions and rarefactions
3- Examples	water waves	Sound waves

3) Oscillatory and wave motion

Points of comparison	Oscillatory	Wave
1- Definition	- it is the motion that is produced by oscillating body at the two sides of its original position.	- It is the motion produced as a result of the vibration of the medium particles at a certain moment and in a definite direction.
2- Velocity	- is maximum when the oscillating body passes its rest position. - is minimum when it goes far from its rest position.	- the wave has a definite velocity along the direction of propagation.
3- Examples	- Pendulum motion - motion of spiral spring	- sound waves as mechanical longitudinal wave. - light waves as electro-magnetic transverse waves.

4- Problems

a) Amplitude (x) = 2 m

b) periodic time (t) = 2 seconds → time of oscillation
= time / no. complete oscillation
= 5/2.5 = 2 seconds

c) frequency (f) = 1/periodic time = 1/2 Hz

2- time = 2 × 60 = 120 seconds

Periodic time = time / no. complete oscillation = 120 / 500 = 0.24 sec

Frequency (f) = 1/periodic time = 4.1 Hz

3- Wave length = velocity / frequency = $\frac{3 \times 10^8}{5 \times 10^8}$

= 0.6 m

4- 3 waves are formed between the first and fourth rarefactions

$$\therefore 4 - 1 = 3$$

$$\therefore \text{Wave length } (\lambda) = \frac{24}{3} = 8 \text{ m}$$

$$\begin{aligned} \therefore \text{Wave velocity } (v) &= \text{wave length } (\lambda) \times \text{wave frequency} \\ &= 8 \times 20 = 160 \text{ m/sec} \end{aligned}$$

$$\begin{aligned} 4- \text{Wave length} &= \text{velocity} / \text{frequency} \\ &= 1500 / 100 = 15 \text{ m} \end{aligned}$$

$$\begin{aligned} 5- \text{Wave velocity } (v) &= \text{wave length } (\lambda) \times \text{wave frequency} \\ &= 0.1 \times 25 = 2.5 \text{ m/s} \end{aligned}$$

$$\begin{aligned} 6- T &= 0.02 \times 2 = 0.04 \text{ Sec} \\ F &= 1/T = 1 / 0.04 = 25 \text{ Hz} \end{aligned}$$

(5) What's meant by:

- 1- The periodic time of spring is $= 60/60 = 1 \text{ sec}$.
- 2- Number of complete oscillation made by pendulum in one sec is 50 complete oscillations.
- 3- Distance between centers two successive compressions or centers of 2 successive rarefactions is 30 cm.
- 4- Maximum displacement achieved by medium particles away from their rest positions is 5 cm.