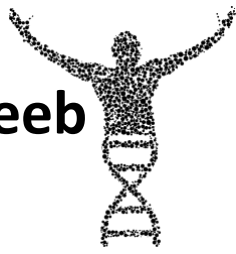


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February Revision
Questions & Answers

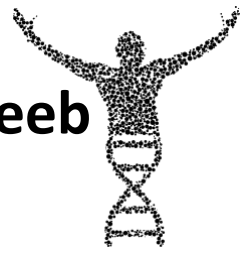
Science Middle 2

By

Dr. Amr Elghareeb



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Middle 2 - February Revision

1) Give reason for the following:

- 1. • The oscillatory motion is considered as a periodic motion.
- The motion of planets around the Sun is considered as a periodic motion.

2. The motion of spring is considered as an oscillatory periodic motion.

3. The velocity of the body is taken as a measure of its kinetic energy.

4. The kinetic energy of a pendulum is maximum when the pendulum passes its rest position.

5. The motion of the rotary bee is a periodic motion only, but it is not an oscillatory motion.

6. The periodic time of an oscillating body decreases as the number of complete oscillations increases at the same time.

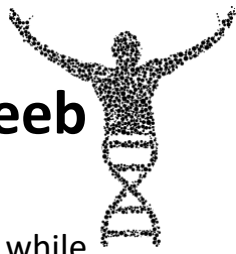
7. Frequency x Periodic time = 1

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

9. Wave motion is considered as a periodic motion.

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10. When a billiard ball strikes a similar second one at rest, the second ball moves while the first one stops.

11. The flame of a candle vibrates forward and backward if we put the candle in front of a loudspeaker.

12. Sound waves are mechanical waves, while radio waves are electromagnetic waves.

13. Water waves are transverse mechanical waves.

14. The waves produced due to vibration of a string are transverse mechanical waves.

15. Sound waves are longitudinal mechanical waves.

16. We see lightning before hearing thunder.

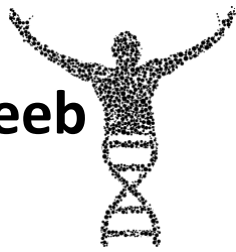
17. Jacuzzi is considered a natural bath.

18. We can't hear the sound of solar explosions, but we can see the light coming out of them.

19. Astronauts use wireless devices to talk to each other on the Moon surface.

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20. The guard dogs sleep with one of their ears on the floor.

21. As the frequency of the wave in the same medium increases, its wavelength decreases.

22. The velocity of light waves equals the velocity of radio waves, although the difference in their frequencies.

2) What is meant by ...?

1. The maximum displacement achieved by an oscillating body is 6 cm.

2. The amplitude of an oscillating body is 4 cm.

3. The periodic time of a tuning fork is 0.5 sec.

4. 1. The time taken by a spring to make 60 complete oscillations is 1 minute.

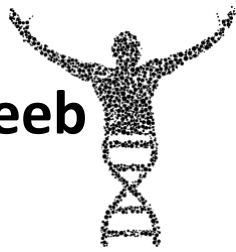
5. The frequency of a simple pendulum is 50 Hertz.

6. The number of complete oscillations made by an oscillating body in a duration of 10 seconds is 500 complete oscillations.

7. The oscillating body makes 30 complete oscillations in one second.

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8. The oscillating body makes 340 oscillations during 42.5 sec.

9. The wavelength of a sound wave is 30 cm.

10. The distance between two successive crests in water waves is 10 cm.

11. Amplitude of a mechanical wave is 5 cm.

12. The distance covered by a visible light wave in space in two seconds equals 6×10^8 meters

13. Velocity of light is 300000 km/s.

14. Velocity of sound = 340 m/s.

15. Frequency of a longitudinal wave is 600 waves/second.

3) Define each of the following :

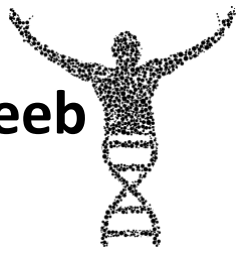
1. Periodic motion.

3. Amplitude.

5. Periodic time.

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2. Oscillatory motion.

.....
.....

4. Complete oscillation.

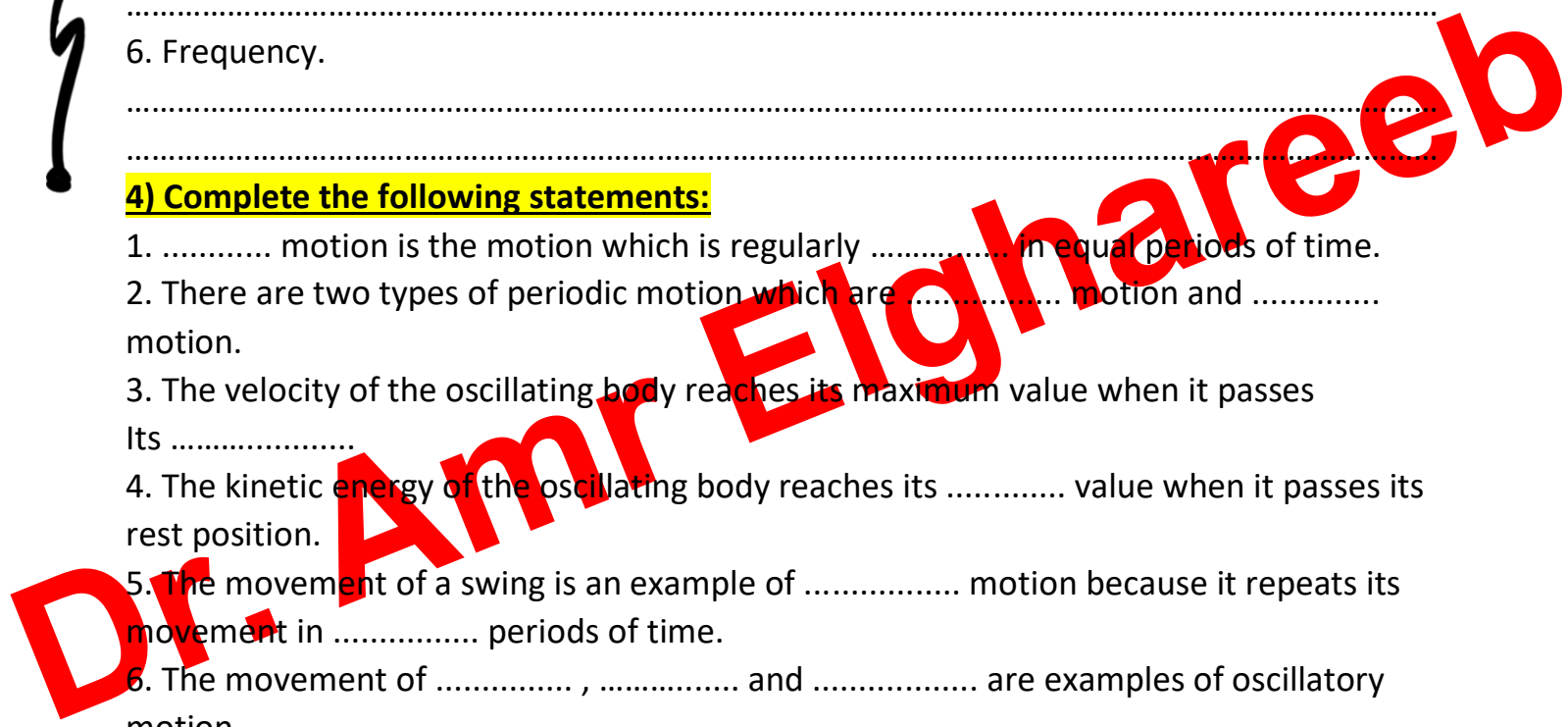
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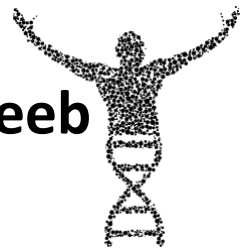
6. Frequency.

.....
.....

4) Complete the following statements:

1. motion is the motion which is regularly in equal periods of time.
2. There are two types of periodic motion which are motion and motion.
3. The velocity of the oscillating body reaches its maximum value when it passes its
4. The kinetic energy of the oscillating body reaches its value when it passes its rest position.
5. The movement of a swing is an example of motion because it repeats its movement in periods of time.
6. The movement of, and are examples of oscillatory motion.
7. The motion of rotary bee is not considered as a/an motion although it is a/an motion.
8. The simple harmonic motion is an example of the
9. The amplitude is and its measuring unit is
10. The complete oscillation includes successive maximum displacements, each one is called.....
11. Frequency = $\frac{\text{.....}}{\text{Periodic time (seconds)}}$
12. For the memorial of the scientist Hertz, the measuring unit of frequency is.....which is symbolized by
13. Megahertz equalsHz and gigahertz equals Hz.
14. The periodic time is the time ofand its measuring unit is.....
15. Frequency isproportional to the periodic time.





16. In wave motion, the waves transfer from the vibrating source to the medium in their propagation direction.
17. When the tuning fork oscillates , is generated and travelled in the form of sound waves.
18. The molecules of the medium during the passing of waves in the direction of wave propagation without from their rest positions.
19. Waves are classified according to the ability to propagate and transfer energy into..... and waves.
20. Waves are classified according to the direction of vibration of medium particles relative to the direction of wave propagation into..... and Waves
21. The mechanical waves are classified into and waves.
22. waves do not need a medium to propagate through, such as..... waves.
23. waves need a medium to propagate through, such as and Waves.
24. Radio waves are considered as..... waves that propagate through free space with a velocity of
25. Transverse wave consists of and.....
26. In the waves, the particles of the medium oscillate perpendicular to the wave propagation direction, while in the waves, the particles of the medium oscillate along the wave propagation direction.
27. Trough is the point of medium particles in the wave.
28. The maximum point of the particles of a medium of a transverse wave is called while the maximum displacement of the simple pendulum from its rest position is called
29. The longitudinal wave consists of..... and.....
30. is the area in the longitudinal wave at which the medium particles are of the highest density and pressure.
31. The crest in the wave is equivalent to the in the longitudinal wave.
32. Jacuzzi is used to treat and cramps by using hot water and by using cold water.
33. The wavelength of the transverse wave is the distance between
34. The wavelength of the longitudinal wave is the distance between





35. The amplitude of the wave is the displacement of the medium particles away from their

36. The velocity of sound waves through air is than its velocity through liquids, while its velocity through solids is than that through liquids.

5) Write the scientific term of each of the following :

1. The motion which is regularly repeated in equal periods of time.
2. The periodic motion made by a body around its point of rest, where the motion is repeated through equal intervals of time.
3. The maximum displacement achieved by the oscillating body away from its rest position.
4. The motion of an oscillating body when it passes by a fixed point in its path two successive times in the same direction.
5. The time taken by the oscillating body to make one complete oscillation.
6. The measuring unit of the periodic time.
7. The number of complete oscillations produced by the oscillating body in one second.
8. The measuring unit of frequency.
9. A disturbance that propagates and transfers energy along the direction of propagation.
10. The periodic motion produced as a result of the vibration of the particles of the medium at a certain moment in a definite direction.
11. The direction of progression of the wave.
12. The waves which need a medium to propagate.
13. The waves which do not need a medium to propagate.
 - A type of waves that can propagate through vacuum.
14. Waves, in which the particles of the medium vibrate perpendicular to the direction of propagation without transferring from their positions.
15. The highest point of the particles of the medium in the transverse wave.
16. The lowest point of the particles of the medium in the transverse wave.
17. Waves, in which the particles of the medium vibrate in the same direction of wave propagation.
18. The area in the longitudinal wave at which the medium particles are of the highest density and pressure.
19. The area in the longitudinal wave at which the medium particles are faraway from each other.

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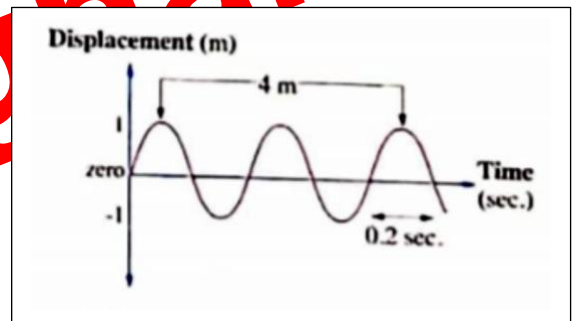




20. A design is composed of a tub. where water moves in the form of circular waves for treating sprains and cramps.
21. The distance between two successive crests or troughs.
22. The distance between the centres of two successive compressions or two successive rarefactions.
23. The measuring unit of wavelength.
24. The maximum displacement of the medium particles away from their rest positions.
25. The distance covered by the wave in one second.

(6) From the opposite figure, find :

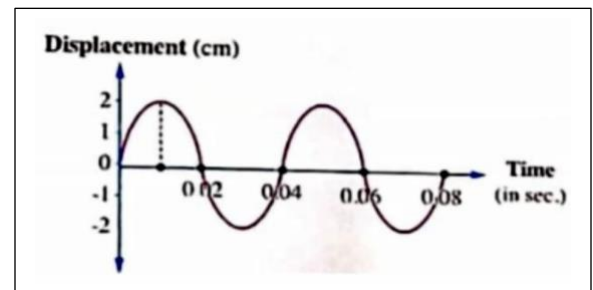
1. Wavelength.
2. Frequency.
3. Amplitude.
4. Wave velocity.



(7) The opposite figure shows the relation between the displacement and the time in a transverse wave that takes place in water with velocity of 20 metres /second.

From the labelled figure, find the value of :

1. Amplitude.
2. Frequency.
3. Wavelength.



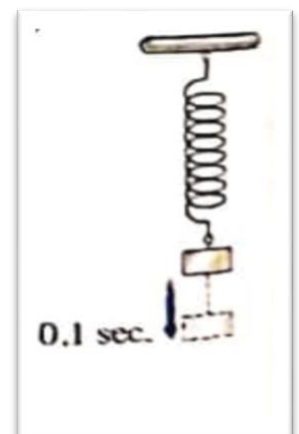
8 . In the opposite figure, if the maximum displacement done by the spring away from its rest position is 3 cm. Using the figure calculate:

1. The vertical distance covered by the spring through 3 complete oscillations equals cm.

- a. 3 b. 12 c. 14 d. 36

2. The frequency of the spring equals Hz.

- a. 0.2 b. 0.4 c. 2.5 d. 5

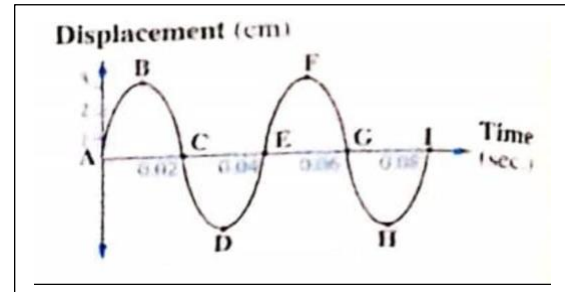




(9) The opposite figure represents an oscillatory motion.

Find:

- The amplitude.
- The periodic time.
- The frequency.



Answers

1. Give Reason:

- Because it is repeated regularly in equal periods of time.
- It is a periodic motion, because it is regularly repeated in equal time intervals and an oscillatory motion, because it is repeated on the two sides of its rest position.
- Because kinetic energy = $\frac{1}{2}$ mass x (velocity)².
- Because the velocity of a pendulum is maximum when the pendulum passes its rest position and the kinetic energy is directly proportional to the square of velocity.
- It is a periodic motion, because it is repeated regularly in equal time intervals, but it is not an oscillatory motion, because it is not repeated on the two sides of its rest position.

6. Because the periodic time is inversely proportional to the number of complete oscillations made by the oscillating body at constant time.

$$\text{(Periodic time} = \frac{\text{time in sec}}{\text{number of complete oscillating}})$$

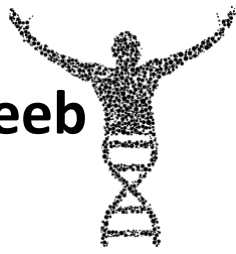
7. Because the frequency is the reciprocal of the periodic time.

$$\text{(Frequency} = \frac{1}{\text{periodic time}})$$

8. Because the frequency is inversely proportional to the periodic time.

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9. Because it is repeated regularly in equal periods of time.
10. Because the first ball transfers its energy to the second one through the rest of the fixed billiard balls.
11. Because the sound waves produced from the loudspeaker propagate carrying the energy in the same direction of propagation causing the vibration of the candle flame.
12. Because sound waves need a medium to propagate through. while radio waves do not need a medium to propagate through.
13. They are transverse waves because the medium particles vibrate perpendicular to the direction of wave propagation forming crests and troughs and mechanical waves because they need a medium to propagate through.
14. They are transverse waves because the medium particles vibrate perpendicular to the direction of wave propagation forming crests and troughs and mechanical waves because they need a medium to propagate through.
15. They are longitudinal waves because the medium particles vibrate along the direction of wave propagation forming compressions and rarefactions and mechanical waves because they need a medium to propagate through.
16. Because the velocity of light waves of lightning (electromagnetic waves) is much greater than that of sound waves of thunder (mechanical waves).
17. Because it is used to treat sprains and cramps by using hot water, and nervous tension by using cold water.
18. Because the sound is mechanical waves which can't propagate through vacuum between the Sun and the Earth, while the light is electromagnetic waves which can propagate through vacuum.
19. Because the sound is mechanical waves which can't propagate through vacuum, while wireless device works with light that can propagate through vacuum.





20. Because the velocity of sound through solids (floor) is greater than its velocity through air, this enables them to hear the sound faster.

21. Because the velocity of the wave is constant in the same medium, therefore the frequency of the wave is inversely proportional to its wavelength.

22. Because both of them are electromagnetic waves that have the same velocity in vacuum, so the product of multiplying the frequency in the wavelength of each of them equals constant value (3×10^8 m/s).

2. What's meant by:

1. This means that the amplitude of an oscillating body is 6 cm (0.06 m).

2 This means that the maximum displacement done by the oscillating body away from its rest position is 4 cm (0.04 m).

3. This means that the time taken by the tuning fork to make one complete oscillation is 0,5 sec.

4. This means that the periodic time of this spring is $\left(\frac{60}{60}\right)$ which equals 1 sec.

5. This means that the number of complete oscillations made by the simple pendulum in one second is 50 complete oscillations.

6. This means that the frequency of the oscillating body is $\left(\frac{500}{10}\right)$ which equals 50 Hz.

7. This means that the frequency of this oscillating body is 30 Hz.

8. This means that the frequency of this oscillating body is 8 Hz.

9. This means that the distance between the centres of two successive compressions or rarefactions in such wave is 30 cm (0.3 m).

10. This means that the wavelength of such wave is 10 cm (0.1 m).

11. This means that the maximum displacement achieved by the medium particles away from their rest positions in such wave is 5 cm

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(0.05 m).

12. This means that the velocity of the visible light wave in space is 3×10^8 m/s.

$$v = \frac{\text{distance}}{\text{time}} = \frac{6 \times 10^8}{2} = 3 \times 10^8 \text{ m/sec.}$$

13. This means that the distance that is covered by a light wave in one second is 300000 km.

14. This means that the distance that is covered by a sound wave through air in one second is 340 metres.

15. This means that the number of complete waves produced in one second is 600 waves.

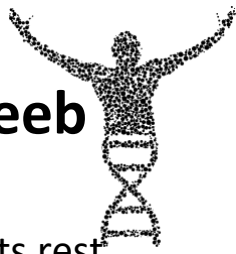
3. Define:

1. It is a motion which is regularly repeated in equal periods of time.
2. It is the periodic motion of the 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 rest 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 the number of complete oscillations made by an oscillating body in one second.

4. Complete:

- | | |
|--|------------------------|
| 1. Periodic - repeated | 2. oscillatory - wave |
| 3. rest position. | 4. maximum |
| 5. oscillatory - equal | |
| 6. tuning fork - stretched string - spring | |
| 7. oscillatory- periodic | 8. oscillatory motion. |

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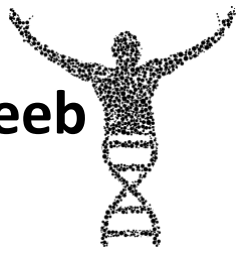


9. the maximum displacement done by the oscillating body away from its rest position - metre.
10. four - amplitude.
11. 1
12. Hertz - Hz.
13. $1 \times 10^6 - 1 \times 10^9$
14. one complete oscillation - second.
15. inversely
16. energy - particles
17. energy
18. vibrate - transferring
19. mechanical - electromagnetic
20. transverse - longitudinal
21. transverse - longitudinal
22. Electromagnetic - light
23. Mechanical - sound - water
24. electromagnetic - 3×10^8 m/sec.
25. crests - troughs.
26. transverse - longitudinal
27. lowest - transverse
28. crest - amplitude.
29. compressions - rarefactions.
30. Compression
31. transverse - centre of compression
32. sprains - nervous tension
33. two successive crests or troughs.
34. the centres of two successive compressions or rarefactions.
35. maximum - rest positions.
36. less – greater

5. Scientific term:

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1. Periodic motion.
2. Oscillatory motion.
3. Amplitude.
4. Complete oscillation.
5. Periodic time.
6. Second.
7. Frequency.
8. Hertz.
9. The wave.
10. The wave motion.
11. Line of wave propagation.
12. Mechanical waves.
13. Electromagnetic waves.
14. Transverse waves.
15. Crest.
16. Trough.
17. Longitudinal waves.
18. Compression.
19. Rarefaction.
20. Jacuzzi.
21. Wavelength of the transverse wave.
22. Wavelength of the longitudinal wave.
23. Metre.
24. Wave amplitude.
25. Wave velocity.





6

1. Wavelength=

$$\frac{\text{The distance which covered by waves}}{\text{Number of waves}}$$

$$\frac{4}{2} = 2 \text{ metres.}$$

2. : Periodic time = $2 \times 0.2 = 0.4 \text{ sec.}$

$$\text{frequency} = \frac{1}{\text{Periodic time}} = \frac{1}{0.4} = 2.5 \text{ Hz.}$$

3. Amplitude = 1 metre

4. Wave velocity (V)

$$= \text{Frequency (F)} \times \text{Wavelength } (\lambda)$$

$$= 2.5 \times 2 = 5 \text{ m/S.}$$

7.

1. Amplitude = 2 cm.

2. Periodic time = 0.04 sec.

$$\text{Frequency} = \frac{1}{\text{Periodic time}} = \frac{1}{0.04} = 2.5 \text{ Hz.}$$

$$\text{3. Wavelength} = \frac{\text{Velocity}}{\text{Frequency}} = \frac{20}{25}$$

$$= 0.8 \text{ m.}$$

8.

1. d

2.c

9.

a .3cm

b. 0.04 sec.

$$\text{c. Frequency} = \frac{1}{\text{Periodic time}} = \frac{1}{0.04} = 25 \text{ Hz}$$

