



Practice Worksheet on Uniform Circular Motion and Oscillatory Motion

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Subject: Physics

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Long Answer Questions

1. Explain the characteristics of uniform circular motion.
2. Define the period of rotation and state its SI unit.
3. Define rotational frequency (n) and specify its unit.
4. Describe the inverse relationship between the period and frequency of rotation.
5. Provide the formula for calculating the speed of an object in uniform circular motion.
6. Give three examples of uniform circular motion in everyday life.
7. Describe oscillatory motion or vibration.

8. Define amplitude and mention its SI unit.

Multiple Choice Questions

1. What is rotational frequency?

- a) The time it takes for an object to make one full rotation.
- b) The number of rotations an object completes in one second.
- c) The distance an object travels in one rotation.
- d) The speed of an object in circular motion.

2. What is the amplitude of an oscillatory motion?

- a) The total distance an object travels in one rotation.
- b) The maximum displacement of an object from its equilibrium position.
- c) The time it takes for one complete oscillation.
- d) The speed of an object in oscillatory motion.

3. What is the period of oscillation?

- a) The time taken for one complete oscillation.
- b) The distance covered in one oscillation.
- c) The number of oscillations in one minute.
- d) The maximum displacement from the mean position.

4. What is the frequency of oscillation?

- a) Number of oscillations per minute.
- b) Number of oscillations per second.
- c) Time taken for one oscillation.
- d) Distance traveled in one oscillation.

5. What is the relationship between period and frequency?

- a) Frequency = $1/\text{Time}$
- b) Time = $1/\text{Frequency}$
- c) Frequency = Amplitude/Time
- d) Time = Amplitude/Frequency

6. For a simple pendulum, how does the time period depend on the amplitude?

- a) It is always constant.
- b) It is directly proportional to the period.
- c) It is independent of the amplitude for small oscillations.
- d) It increases with amplitude.

7. In non-damped oscillatory motion, what happens to the amplitude?

- a) Decreases with time.
- b) Remains constant with time.
- c) Increases with time.
- d) Changes erratically with time.

8. In damped oscillatory motion, what happens to the amplitude?

- a) Increases with time.
- b) Decreases with time.
- c) Remains constant with time.
- d) Fluctuates randomly with time.

Answer Key

Long Answer Questions - Expected Responses

1. Explain the characteristics of uniform circular motion.

Expected Answer: Uniform circular motion has a constant speed, but changing velocity; it follows a circular path.

2. Define the period of rotation and state its SI unit.

Expected Answer: The period of rotation is the time it takes for one complete rotation, measured in seconds (SI unit).

3. Define rotational frequency (n) and specify its unit.

Expected Answer: The rotational frequency (n) is the number of rotations per unit time (usually one second), expressed in hertz (Hz) or rotations per second (rps).

4. Describe the inverse relationship between the period and frequency of rotation.

Expected Answer: The relationship between the period and frequency of rotation is inverse; one increases as the other decreases.

5. Provide the formula for calculating the speed of an object in uniform circular motion.

Expected Answer: The speed in uniform circular motion is calculated by the formula: $v = 2\pi R/T$, where 'R' is the radius and 'T' is the period.

6. Give three examples of uniform circular motion in everyday life.

Expected Answer: Examples include Ferris wheels, merry-go-rounds, and the rotation of the Earth around the Sun.

7. Describe oscillatory motion or vibration.

Expected Answer: Oscillatory motion, also known as vibration, involves the repetitive back-and-forth movement of an object around its equilibrium position.

8. Define amplitude and mention its SI unit.

Expected Answer: Amplitude is the greatest displacement from the equilibrium position, and it's measured in meters (SI unit).

Multiple Choice Questions – Correct Answers

1. What is rotational frequency?

Correct Answer: The number of rotations an object completes in one second.

2. What is the amplitude of an oscillatory motion?

Correct Answer: The maximum displacement of an object from its equilibrium position.

3. What is the period of oscillation?

Correct Answer: The time taken for one complete oscillation.

4. What is the frequency of oscillation?

Correct Answer: Number of oscillations per second.

5. What is the relationship between period and frequency?

Correct Answer: $\text{Time} = 1/\text{Frequency}$

6. For a simple pendulum, how does the time period depend on the amplitude?

Correct Answer: It is independent of the amplitude for small oscillations.

7. In non-damped oscillatory motion, what happens to the amplitude?

Correct Answer: Remains constant with time.

8. In damped oscillatory motion, what happens to the amplitude?

Correct Answer: Decreases with time.