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UNDER THE AGIS OF S. S. SITARAMSINGH EDUCATIONAL AND CHARITABLE TRUST

MOHANPUR, SITAMARHI- 843302

5. Measurement of Length and Motion

शब्द (Word)	अर्थ (Hindi Meaning)
Measurement	मापन
Physical quantity	भौतिक राशि
Standard units	मानक इकाइयाँ
Handspan	बालिशतः पूरी तरह से फैले हुए हाथ में अंगूठे के सिरे से लेकर छोटी उंगली के सिरे तक की दूरी
Mass	द्रव्यमान
Decade	दशकः 10 वर्ष की समयावधि।
Century	शताब्दीः 100 वर्ष की समयावधि।
Millennium	सहस्राब्दीः 1000 वर्ष की समयावधि।
Temperature	तापमानः शरीर या वातावरण की गर्मी की माप, जिसे डिग्री सेल्सियस में मापा जाता है।
Thermometer	थर्मामीटरः तापमान मापने के लिए उपयोग किया जाने वाला उपकरण।
Ruler (Scale)	पैमाना/स्केल

Measuring tape	मापने वाला फीता
Tailor's tape	दर्जी का फीता
Eye Position	आँख की स्थिति
Thread	धागा
Reference Point	संदर्भ बिंदु
Rest	विराम
Motion	गति
Relative Motion	सापेक्ष गति
Linear Motion	रैखिक गति
Circular Motion	वृत्तीय गति
Oscillatory Motion	दोलन गति
Mixed Motion	मिश्रित गति
Multiple Motion	बहु-गति
Pendulum	लोलक (पेंडुलम)
Bob	गोलक: लोलक के अंत में स्वतंत्र रूप से लटका हुआ द्रव्यमान।
Hula Hoop	हूला हूप: एक वस्तु जो घूमते हुए (वृत्तीय) और उपयोगकर्ता के शरीर के हिलने (दोलन) से मिश्रित गति को दर्शाती है।

Ferris Wheel	फेरिस व्हील: एक बड़ा झूला जो मिश्रित गति को दर्शाता है, जहाँ पूरा पहिया एक घेरे में घूमता है जबकि डिब्बे आगे-पीछे झूलते हैं।
Girth	परिधि/घेरा: पेड़ के तने जैसी घुमावदार सतह के चारों ओर की मोटाई की माप, जिसे सटीक रूप से मापने के लिए लचीले फीते की आवश्यकता होती है।

Intext Questions (Page 74)

Fill in the blanks:

1. The **thermometer** is used to measure temperature.
2. A **handspan** is a traditional way of measuring length using the distance from the thumb to the little finger.
3. The **International** System of Units (SI) is the most widely used measurement system worldwide.
4. We use a **measuring cup** to measure the amount of flour for baking.
5. Measuring an object involves two parts: a **number** and a unit.

Intext Questions (Page 85)

Answer in one word or one sentence:

1. **What is a fixed point used to describe the position of an object?** Reference point.
2. **How do we know if an object is moving?** If its position relative to a reference point changes over time.
3. **What kind of motion does a swinging pendulum have?** Oscillatory motion.
4. **Give an example of an object that shows circular motion.** A merry-go-round (or a ball on a string).
5. **What is the motion called when an object moves in a straight line?** Linear motion.

EXERCISES

A. Choose the correct option.

1. What is the SI unit for measuring length?
b. Metre
2. Which type of motion does a falling object typically show?
c. Linear

3. What is the term for a fixed location used to describe the position of something else?
d. Reference point
4. How many centimetres are there in 1 meter?
b. 100
5. What type of motion does a pendulum show?
c. Oscillatory

B. Fill in the blanks.

1. A **thermometer** is used to measure temperature.
2. The International System of Units is also known as the **SI** system.
3. 1 kilometre equals **1000** meters.
4. An object moving in a straight line shows **linear** motion.
5. When an object moves back and forth repeatedly, it shows **oscillatory** motion.

C. Write T for true and F for false statements.

1. Circular motion is when an object moves in a straight line. **F (False)**
2. An object at rest does not change its position relative to its reference point. **T (True)**
3. Mixed motion involves only one type of motion at a time. **F (False)**
4. A moving bus has both linear and circular motion. **T (True)**
5. Relative motion depends on your point of view. **T (True)**

D. Match the following columns.

1. Thermometer -> **b. Temperature**
2. Stopwatch -> **e. Time**
3. Metre -> **a. Length**
4. Kilogram -> **c. Mass**
5. Circular motion -> **d. Merry-go-round**

E. Answers the following questions in 20-30 words.

1. **What is a reference point?**
A fixed location used to describe the position of something else.
2. **How can you tell if an object is in motion?**
An object is in motion if its position relative to a reference point changes over time.

3. **Define linear motion with an example.**

When an object moves along a straight line, it is in linear motion. Example: A mango falling from a tree.

4. **What is circular motion?**

It is when an object moves along a curved path or circle and repeats continuously.

5. **Explain oscillatory motion with an example.**

When an object moves back and forth repeatedly around a central position. Example: A swinging pendulum.

6. **How does relative motion work?**

Relative motion means that whether an object is considered moving or at rest depends entirely on the observer's point of view or reference point.

7. **What does "at rest" mean in terms of motion?**

An object is "at rest" when its position remains the same relative to the reference point over time.

8. **Give an example of mixed motion.**

A bicycle is an example: the wheels spin (circular motion), while the whole bicycle moves forward (linear motion).

9. **Why is a reference point important in describing motion?**

It provides a fixed location to compare against, making it possible to determine if an object's position is actually changing over time.

F. Answers the following questions in 60-80 words.

1. **Explain the three types of motion with examples.**

Linear motion occurs when an object moves strictly in a straight line, like a mango falling from a tree. Circular motion is when an object follows a curved path or circle, such as a merry-go-round. Oscillatory motion is a repetitive to-and-fro movement around a central point, like a swinging pendulum.

2. **Describe how to measure length correctly using a ruler or a measuring tape.**

Place the scale in direct contact with the object, perfectly aligned along its length. Ensure your eyes are positioned directly above the measurement point to avoid visual errors. If the scale is damaged or the zero mark is unclear, start at a clear mark (like 1.0 cm) and subtract that starting point from your final measurement.

3. **Why is the International System of Units (SI) important? How does it help in everyday life?**

The SI system is vital because it creates a common system of measurement worldwide, preventing confusion across different regions. In everyday life, standard units ensure accuracy and consistency. Whether you are measuring ingredients for baking, checking body temperature, or buying cloth, SI units guarantee that everyone gets the exact same reliable result.

4. **Explain how the same object can be both in motion and at rest depending on the reference point.**

Motion entirely depends on the observer's point of view, known as relative motion. For example, passengers sitting inside a moving bus appear to be at rest relative to one another. However, to someone standing outside the bus, the bus and all the passengers inside are clearly in motion.

5. **How has measurement evolved over time? Discuss the shift from non-standard to standard units.**

Historically, people measured things using body parts, like a handspan or the length of an arm. Because hand and body sizes vary from person to person, these methods were inconsistent and led to mistakes. To solve this, standard units (like the SI units) were developed so that measurements would remain exact and consistent globally, regardless of who is measuring.

6. **Describe the process of measuring a curved line. Why can't we use a regular ruler for this?**

A regular ruler is rigid and cannot bend along a curved surface. To measure a curved line, lay a piece of thread carefully along the curve, following every twist. Mark the spot where the curve ends on the thread, then straighten the thread and measure its length against a standard ruler.

7. **Explain the concept of mixed motion using the example of a bicycle in motion.**

Mixed motion, or multiple motion, happens when an object exhibits more than one type of motion simultaneously. On a moving bicycle, the whole vehicle moves forward in a straight line (linear motion). At the same time, the wheels spin around their axles (circular motion), and the rider's legs pedal up and down (oscillatory motion).

8. **How does understanding different types of motion help us in our daily lives? Give examples.**

Understanding motion helps us comprehend and predict how objects interact in our environment. For example, knowing how mixed motion works explains complex mechanical movements, like a bicycle moving forward while its wheels spin. Recognizing oscillatory and circular motions also helps us safely use machinery, design toys like hula hoops or yo-yos, and understand our relative movement when traveling in vehicles.

G. Assertion/Reason Questions:

1. Assertion: A falling object shows linear motion. Reason: Linear motion is when an object moves in a straight line.
a. Both assertion and reason are true, and the reason explains the assertion.
2. Assertion: Mixed motion involves only circular motion. Reason: Mixed motion is a combination of different types of motion.
d. The assertion is false, but the reason is true.
3. Assertion: A pendulum is an example of oscillatory motion. Reason: Oscillatory motion is a repetitive to-and-fro movement.
a. Both assertion and reason are true, and the reason explains the assertion.