UNIQUE STUDY POINT

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Class: VI	**Subject:** Science	**Session:** 2025-26
Chapter: 05 - Measurement of Length and Motion	**Time:** 1½ Hours	**Max. Marks:** 40

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

SECTION A - Multiple Choice Questions (1 mark each)

Q1. The symbol for metre is:

(a) M

(b) m

(c) mt

(d) mtr

Q2. Which of the following is a flexible measuring device?

(a) metre scale

(b) 15-cm scale

(c) measuring tape

(d) wooden scale

Q3. The motion of hands of a clock is:

(a) linear motion

(b) circular motion

(c) oscillatory motion

(d) random motion

Q4. 1 millimetre is equal to:

(a) 0.01 cm

(b) 0.1 cm

(c) 1 cm

(d) 10 cm

Q5. For measuring larger lengths, we use:

(a) millimetre

(b) centimetre

(c) kilometre

(d) angula

Q6. Motion of a ball thrown upward is an example of:

(a) circular motion

(b) linear motion

(c) oscillatory motion

(d) random motion

Q7. The ancient Indian unit 'yojana' was used to measure:

(a) small lengths

(b) very large distances

(c) thickness

(d) width

Q8. A boy is sitting in a moving bus. He is at rest with respect to:

(a) trees outside

(b) the bus

(c) buildings outside

(d) the road

Q9. 2.5 kilometres is equal to:

(a) 25 metres

(b) 250 metres

(c) 2500 metres

(d) 25000 metres

Q10. The scale should be placed in contact with the object:

(a) at an angle

(b) parallel to its length

(c) far from the object

(d) perpendicular to its length

SECTION B - Short Answer Questions (2 marks each)

Q11. What is meant by linear motion? Give two examples.

Q12. Convert the following:
(i) 850 millimetres into centimetres
(ii) 0.75 kilometres into metres

Q13. Why is it important to keep your eye directly above the point being measured?

Q14. Name any four body parts that were used as units of measurement in olden days.

SECTION C - Short Answer Questions (3 marks each)

Q15. Explain the structure of a 15-cm scale. What is the smallest value of length that can be measured using it?

Q16. What is periodic motion? Explain with two suitable examples from daily life.

Q17. Compare and contrast linear motion and circular motion. Give two examples of each.

SECTION D - Long Answer Question (5 marks)

Q18. Describe the correct procedure for measuring the length of an object using a metre scale. What precautions should be taken to avoid errors in measurement? Also explain how to use a scale with broken ends.

SECTION E - Case Study Based Questions (4 marks each)

Q19. Case Study 1:

A tailor is making school uniforms. She needs to take measurements of students. She has a measuring tape and a 15-cm scale. A mother instructs her to increase the length of the uniform by "char angula" (four fingers width).

Based on this information, answer the following:

(a) Why does the tailor use a measuring tape instead of a metre scale? (1 mark)

(b) Is "char angula" a standard unit of measurement? Why or why not? (1 mark)

(c) If different tailors use "angula" for the same uniform, will they get the same measurement? Explain. (1 mark)

(d) Suggest a better way for the mother to specify the additional length required. (1 mark)

Q20. Case Study 2:

In a children's park, there are various rides and equipment:

- A slide where children slide down
- A see-saw that moves up and down
- A merry-go-round that rotates
- A swing that moves back and forth

Based on this information, answer the following:

(a) Which equipment shows linear motion? (1 mark)

(b) Name two equipment that show periodic motion. (1 mark)

(c) The motion of a see-saw is similar to which other equipment in the park? What type of motion is this? (1 mark)

(d) If you are sitting on the merry-go-round, are you in motion with respect to the ground? Explain. (1 mark)

DETAILED ANSWER KEY - PAPER 03

SECTION A - Answers to MCQs

Ans 1. (b) m

The symbol for metre is 'm' (lowercase).

Ans 2. (c) measuring tape

Measuring tape is flexible and can be used to measure curved surfaces.

Ans 3. (b) circular motion

The hands of a clock move along a circular path.

Ans 4. (b) 0.1 cm

1 millimetre = 0.1 centimetre (1 mm = 0.1 cm)

Ans 5. (c) kilometre

Kilometre is used for measuring larger distances like the distance between cities.

Ans 6. (b) linear motion

A ball thrown upward moves along a straight line, which is linear motion.

Ans 7. (b) very large distances

Yojana was an ancient Indian unit used for measuring very large distances.

Ans 8. (b) the bus

The boy is at rest with respect to the bus as his position inside the bus is not changing.

Ans 9. (c) 2500 metres

2.5 km = 2.5 × 1000 = 2500 metres

Ans 10. (b) parallel to its length

The scale should be placed in contact with the object along its length (parallel to it).

SECTION B - Answers to Short Answer Questions

Ans 11. Linear Motion:

Definition: When an object moves along a straight line, its motion is called linear motion.

Examples:
1. A train moving on a straight track
2. An athlete running on a straight race track

Ans 12. Conversions:

(i) 850 mm = 850 ÷ 10 = 85 centimetres
(ii) 0.75 km = 0.75 × 1000 = 750 metres

Ans 13. Importance of eye position:

It is important to keep the eye directly above the point being measured to avoid **parallax error**. If the eye is at an angle, the reading appears different from different positions, leading to incorrect measurements. By keeping the

eye directly above, we ensure that we read the scale accurately and get the correct measurement.

Ans 14. Body parts used for measurement:

Four body parts used as units of measurement in olden days:
1. Handspan (distance between tip of thumb and little finger when stretched)
2. Cubit (length of forearm from elbow to fingertips)
3. Foot (length of foot)
4. Angula (finger width)

SECTION C - Answers to Short Answer Questions

Ans 15. Structure of a 15-cm scale:

Structure:
- A 15-cm scale has markings from 0 to 15 centimetres
- The length between two consecutive big marks (like between 1 and 2, or between 5 and 6) is 1 centimetre
- Each 1-cm section is further divided into 10 equal smaller divisions
- Each small division represents 1 millimetre

Smallest Measurable Length:
The smallest value of length that can be measured using a 15-cm scale is **1 millimetre (1 mm)**. This is equal to 0.1 centimetre.

Ans 16. Periodic Motion:

Definition:
When an object repeats its path after a fixed interval of time, its motion is said to be periodic motion.

Example 1 - Circular Motion:
The motion of Earth around the Sun is periodic. The Earth completes one revolution in approximately 365 days and repeats this circular path continuously. This is why we have regular seasons and a yearly calendar.

Example 2 - Oscillatory Motion:
The motion of a pendulum in a clock is periodic. The pendulum swings to and fro, repeating its motion after a fixed time interval. This regular periodic motion is used to keep accurate time in pendulum clocks.

Note: Both circular and oscillatory motions are examples of periodic motion.

Ans 17. Comparison of linear and circular motion:

Linear Motion:
- Definition: Motion along a straight line
- Path: Straight
- Direction: Same throughout or changes once (up/down)
- Examples: (1) A car on a straight highway, (2) A falling apple

Circular Motion:
- Definition: Motion along a circular path
- Path: Circular/curved
- Direction: Continuously changing
- Examples: (1) Hands of a clock, (2) Blades of a ceiling fan

Common Point: Both types can be periodic or non-periodic depending on whether they repeat their motion.

SECTION D - Answer to Long Answer Question

Ans 18. Procedure for measuring length and precautions:

Correct Procedure for Measuring Length:

Step 1 - Selection: Select an appropriate measuring device based on the length to be measured. Use a 15-cm scale for small objects, a metre scale for medium lengths, and a measuring tape for larger or curved lengths.

Step 2 - Placement: Place the scale in direct contact with the object along its length. The scale should lie flat against the object and be parallel to it.

Step 3 - Alignment: Align the zero mark of the scale with one end of the object.

Step 4 - Reading: Note the reading at the other end of the object. Ensure your eye is directly above the point being measured.

Step 5 - Recording: Record the measurement with both the number and the unit (e.g., 12.5 cm).

Important Precautions:

1. Correct Placement of Scale:
- The scale must be in direct contact with the object
- It should be placed along the length being measured, not at an angle
- The scale should not be bent or tilted

2. Correct Eye Position:
- The eye should be directly above the point being measured
- Looking from an angle causes parallax error
- This error makes the reading appear different from what it actually is

3. Using Broken Scale:
- If the zero mark is damaged or the end is broken, do not start from zero
- Instead, start from any other clear full mark (like 1.0 cm or 2.0 cm)
- Note both readings and subtract the starting value from the final value

Example of Using Broken Scale:
If measuring a pencil with a scale broken at the start:
- Place one end at the 2.0 cm mark
- The other end reaches 14.8 cm
- Length = 14.8 - 2.0 = 12.8 cm

Additional Tips:
- Always write the unit along with the number
- For accurate measurements, measure multiple times and take the average
- Use appropriate instruments for different types of lengths (curved, straight, large, small)

SECTION E - Answers to Case Study Based Questions

Ans 19. Case Study 1 - Answers:

(a) The tailor uses a measuring tape instead of a metre scale because:
- A measuring tape is flexible and can easily measure body parts like chest, waist, and arm length which have curves
- It can be wrapped around the body to get accurate measurements
- A rigid metre scale cannot follow the curves of the body and would give inaccurate measurements

(b) No, "char angula" (four fingers width) is **not a standard unit**.
Reason: Finger width varies from person to person. What is four fingers width for one person may be different from another person's four fingers width. Standard units like centimetres or metres are the same everywhere and for everyone.

(c) No, different tailors will not get the same measurement if they use "angula".
Explanation: Since angula (finger width) is different for different people, each tailor will have a different size of "four fingers." One tailor might add 6 cm while another might add 8 cm for the same "char angula" instruction. This will result in uniforms of different lengths.

(d) A better way for the mother to specify the additional length:
The mother should specify the additional length in standard units like centimetres. For example, she should say "Please increase the length by 8 centimetres" instead of "char angula." This ensures that:
- The measurement is accurate and precise
- Any tailor will understand and add exactly the same length
- There is no confusion or variation in the final product

Ans 20. Case Study 2 - Answers:

(a) The **slide** shows linear motion. Children slide down along a straight or nearly straight path from top to bottom.

(b) Two equipment that show periodic motion:
1. **Swing** - Shows oscillatory periodic motion (moves back and forth repeatedly)
2. **Merry-go-round** - Shows circular periodic motion (rotates in a circle repeatedly)

(c) The motion of a see-saw is similar to the **swing**.
Type of motion: Both show **oscillatory motion**. The see-saw moves up and down about a fixed central point (fulcrum), just as the swing moves to and fro about its fixed hanging point. Both repeat their motion in a regular pattern.

(d) Yes, if you are sitting on the merry-go-round, you are **in motion** with respect to the ground.
Explanation:
- When we take the ground as the reference point, your position is continuously changing
- As the merry-go-round rotates, you move in a circular path
- Your distance and direction from any fixed point on the ground keep changing
- Therefore, you are in circular motion with respect to the ground
- However, with respect to the merry-go-round itself, you would be at rest (your position on the ride is not changing)
