Pakistan School
Kingdom of Bahrain

Class: 9th

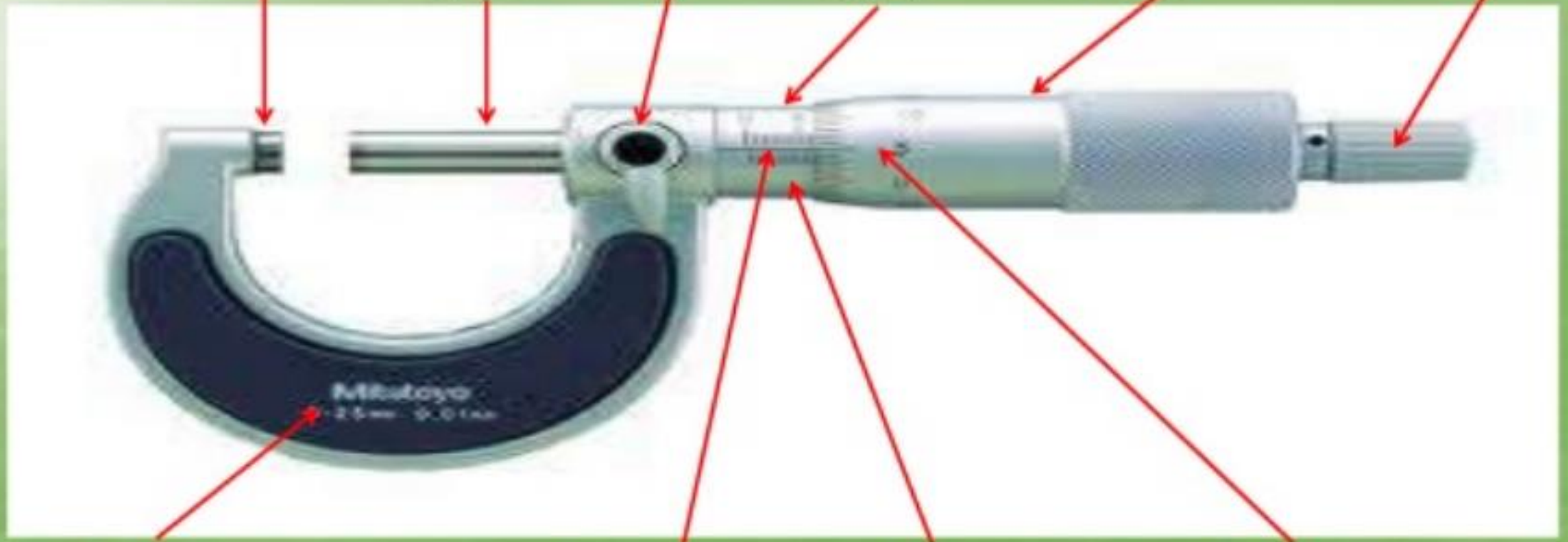
Subject: Physics

Use of Micrometer screw gauge

INTRODUCTION

Micrometer screw gauge has a fine threaded movement so that small distances can be measured, with a vernier scale which allows measurement down to thousandths of an inch.

PARTS OF A MICROMETER



SPECIAL DEFINITIONS ON MICROMETER MEASUREMENTS

Pitch- Pitch of the screw is the distance moved by the spindle per revolution

Pitch may vary for different micrometers

Least count = Pitch / No.of divisions on the circular scale

E.g.: The least count for a micrometer of 100 equal divisions and of pitch 0.5 mm is,

Least count = 0.5mm/100 =0.005mm

MICROMETER

Although the least count may vary between different micrometers, the length formula for any micrometer is as follows:

Total observed reading = main scale reading +

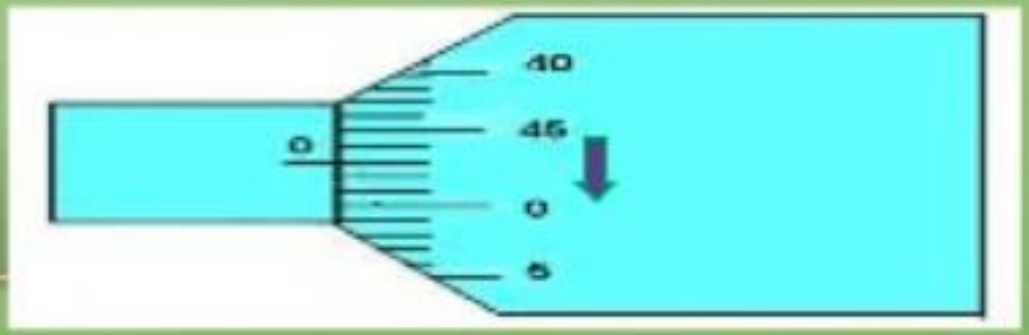
[(circular scale division coinciding the base line of main scale) x least count]

ERRORS IN A MICROMETER READING

There can be two types of zero errors in a micrometer reading:

1. Positive zero error

Happens when the zero of the circular/auxillary scale places below the zero of the meter scale reading

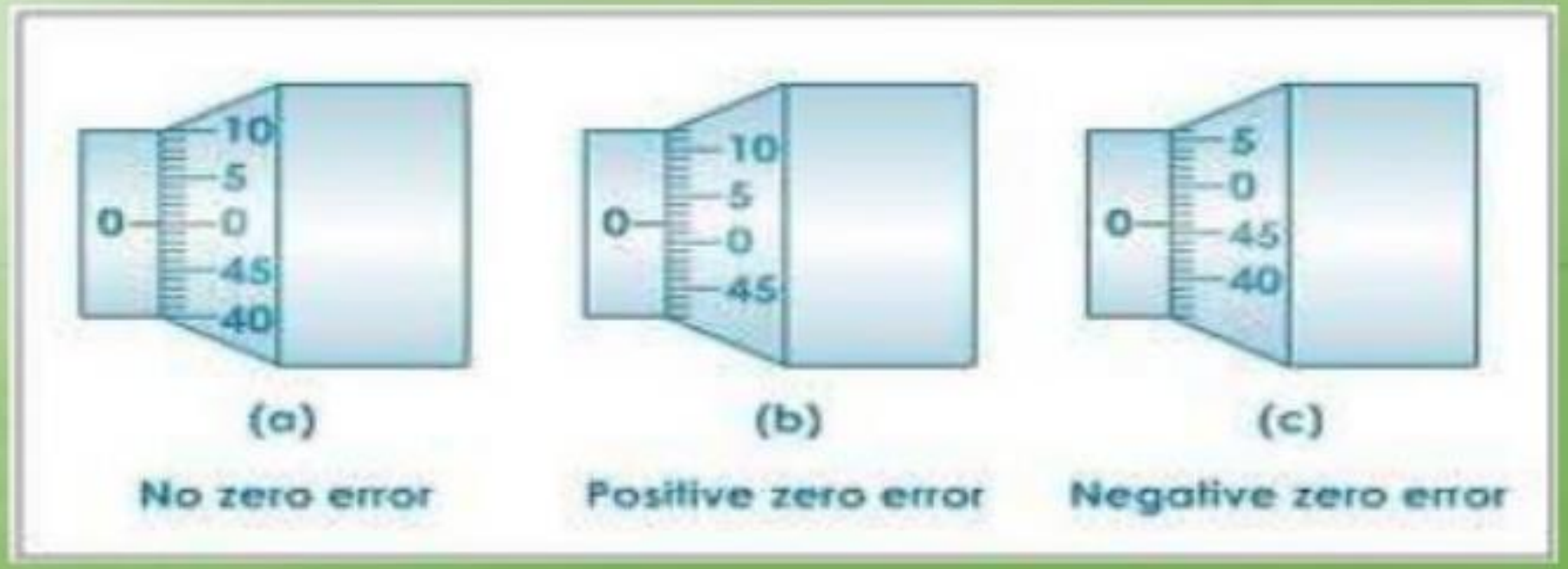


2. Negative zero error

Happens when the zero of the circular/auxillary scale places above the zero of the meter scale reading

NO ZERO ERROR

No zero error is the precise arrangement of the meter scale and the cicular scale so that the zeros of both scales fit each other as follows:



To take precise measurements, we have to ensure that the micrometer we are using is of no zero error.

TAKING MEASUREMENTS

1. First find whether there's an error on the micrometer
2. Then find its least count using the pitch
3. Move away the rachet and place the object. Then move the rachet in the opposite direction
4. For accurate reading, the thimble should be moved until three clicks are heard from the ratchet.
5. Find the main scale reading. If the main scale shows an additional 0.5mm, we have to add that as well.

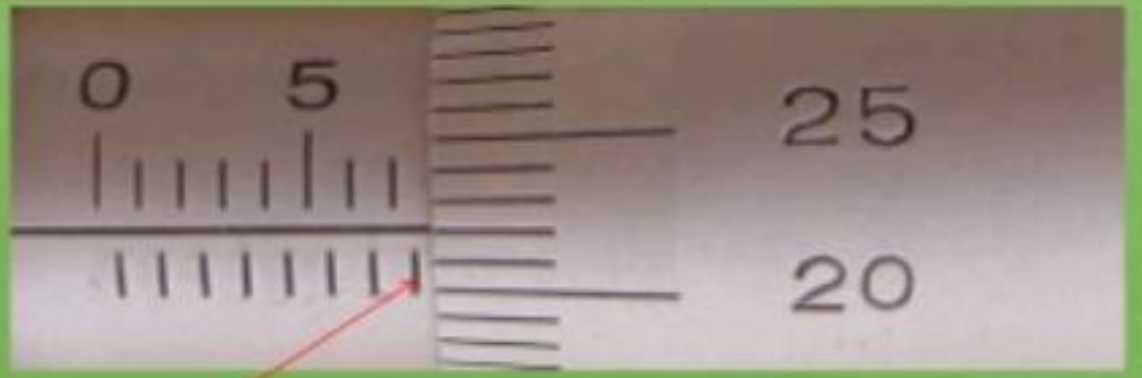
6. Then find the value of the circular/auxillary scale that coincides with the main scale.

7. Finally multiply the reading from the circular/auxillary scale by the least count and add this product to the main scale reading to get the final reading.

Example:

0.5 mark not visible

Therefore, the reading would be = 0.7 + (38×0.01) = 0.738 cm



0.5 mark visible

Therefore, the reading would be = 0.7 +0.05+ (22×0.01) = 0.772 cm