

# Experiment No: 6

- **Title: Vernier Bevel Protractor**
- **Objectives:**
  - i. Understand different parts of vernier bevel protractor,
  - ii. Know the use and working of bevel protractor,
  - iii. Understand the use of vernier bevel protractor.

- It is also called universal bevel protractor. It is one of the simplest instruments for angular measurement.
- It is a direct type of angular measuring instrument. The range of this instrument is 0 to 360 degrees i.e. it can measure angles upto 360° which any other angular metrological instrument cannot measure.
- It has two arms (Fixed blade and Adjustable Blade), which can be set along the faces and a circular scale to indicate the angle between them.
- Workpiece is set in between these two arms (two blades, fixed blade and adjustable blade), and the difference of two scale (main scale and vernier scale) readings gives accurate measurement.



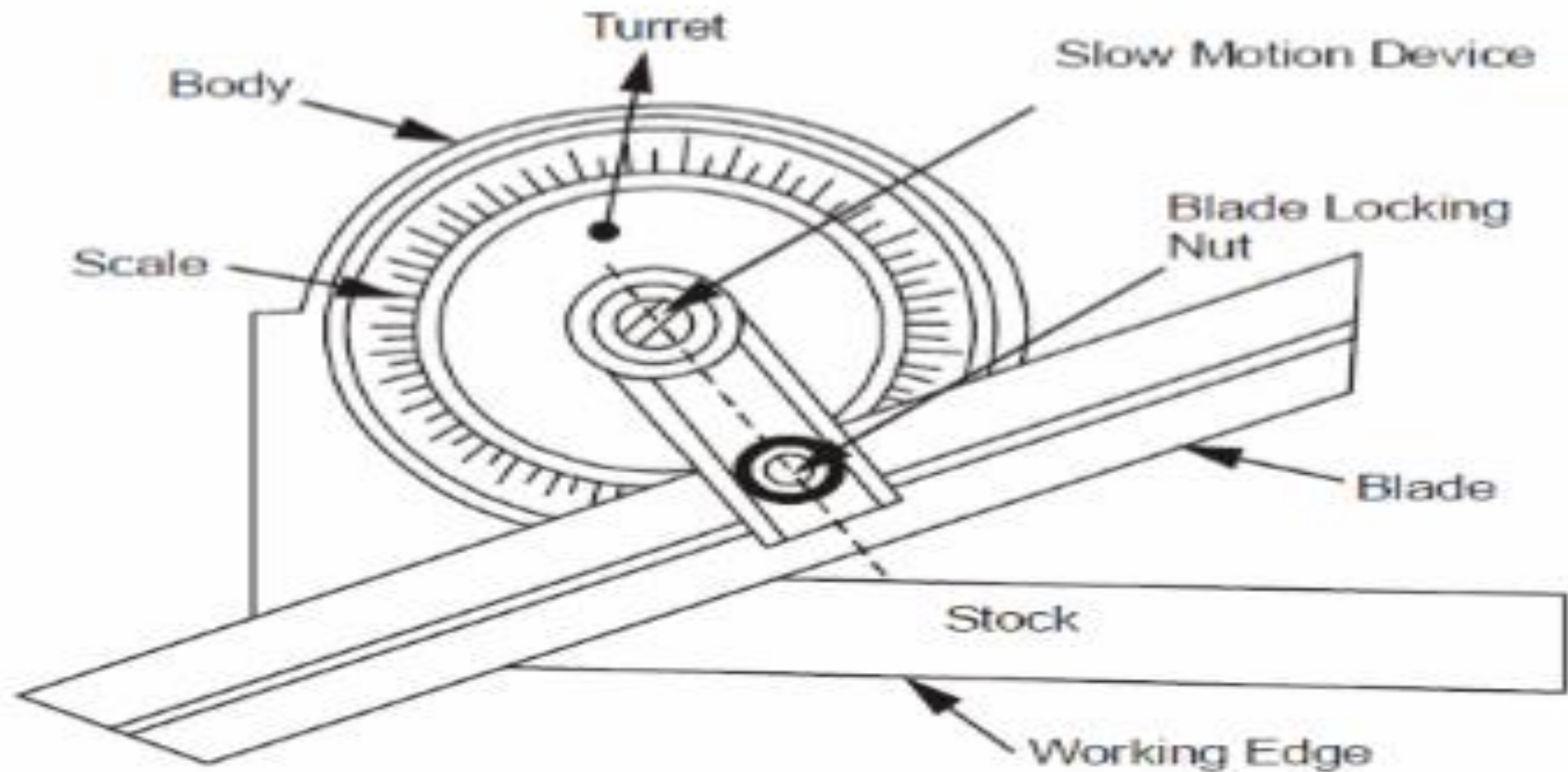
Main parts of bevel protractor are

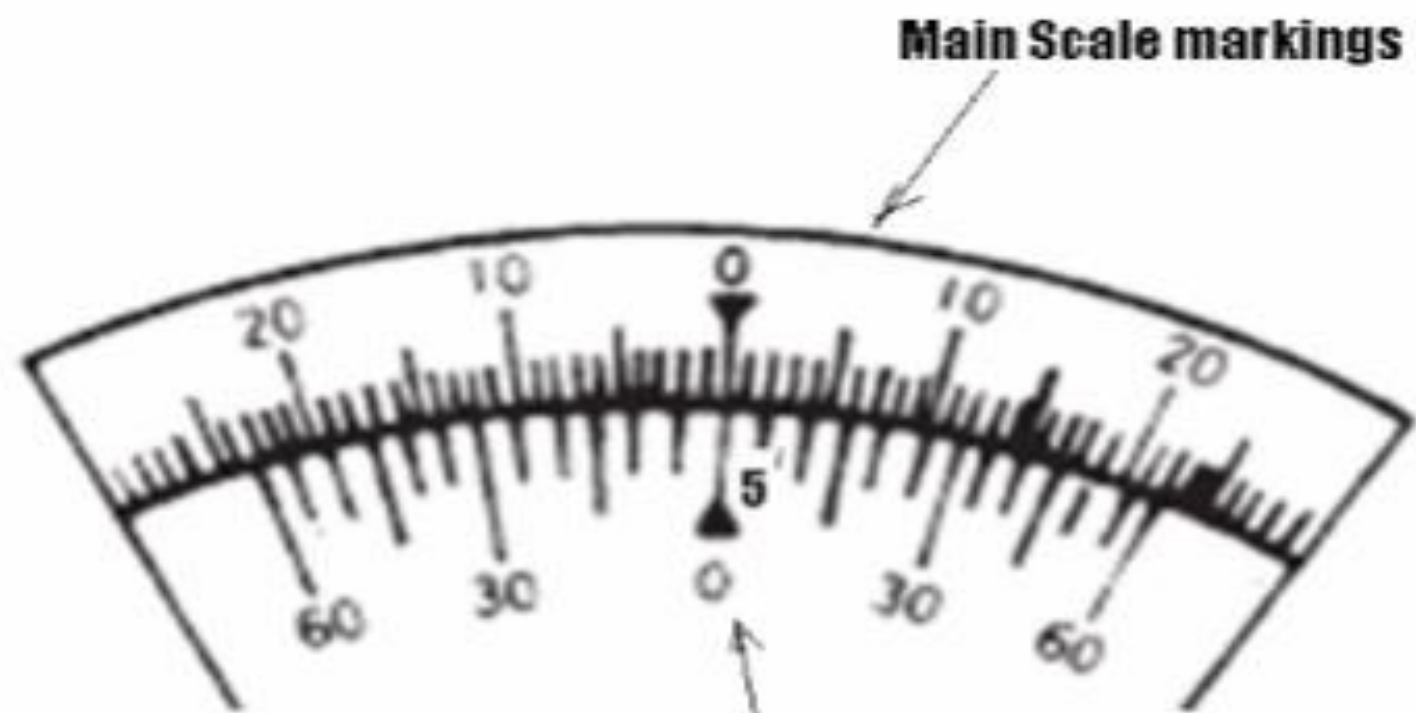
- 1. Fixed Base blade and a circular body is attached to it.
- 2. Adjustable blade.
- 3. Blade clamp.
- 4. Scale magnifier lens.
- 5. Acute angle attachment.

- Magnifying lens has been provided for easy reading of the instrument.
- Main scale is circular and is graduated in degrees on the circular body. Main scale graduations are all around the circular body which is attached to fixed base blade. Fixed base blade also called as stock is attached to circular body of bevel protractor
- Once the reading is fixed, blade clamp fixes the reading.

- Blades are about 150 mm long or 300mm long, 13mm wide and 2mm thick. Its ends are beveled at angles of 45 degree and 60 degree.
- Vernier scale is also marked on turret which can rotate all over the fixed body. Adjustable blade can pass through the slot provided in turret. So as the turret rotates, adjustable blade also rotates full 360 degrees. There are 12 graduations of Vernier scale starting from 0 to 60o on both sides of zero of Vernier scale.

## Bevel Protractor:





**Main Scale markings**

**12 vernier scale markings on each side of zero (0)**

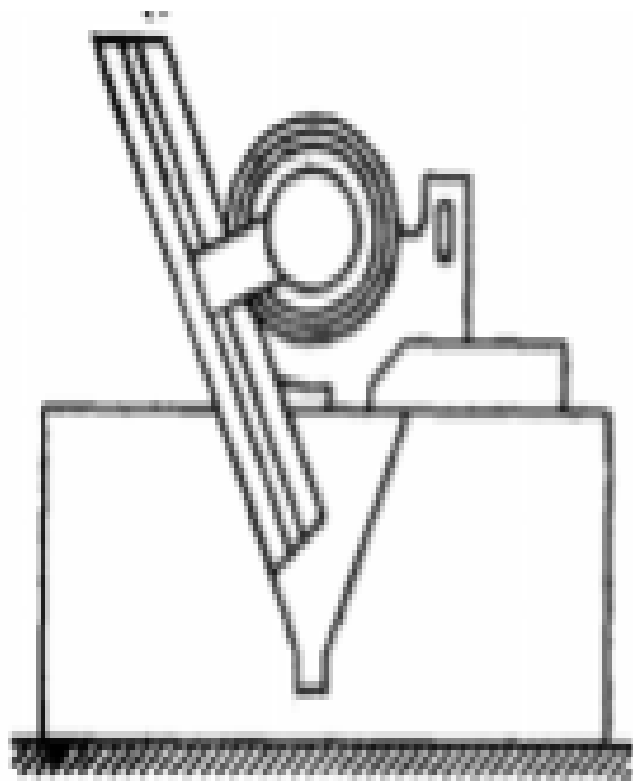
- Least count of Vernier bevel protractor=  
smallest division on main scale / Total no of divisions on Vernier scale  
=i.e.  $60 / 12$   
= 5 minutes (written as 5')

### **Applications of Vernier Bevel Protractor:**

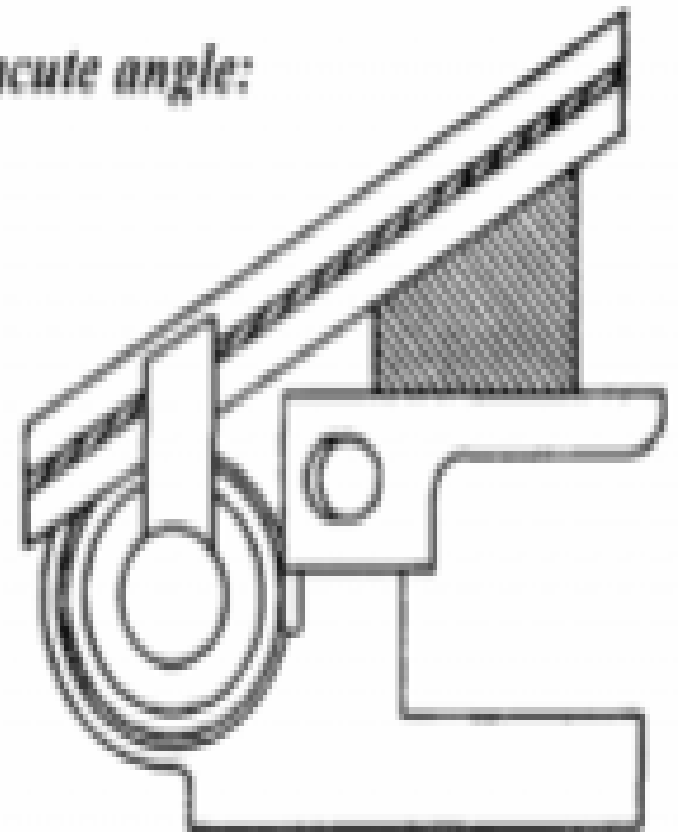
The bevel protractor can be used in the following applications:



1. For checking a 'V' block:



2. For measuring acute angle:



# Procedure to conduct experiment:

- (a) Study the bevel protractor and identify its main parts.
- (b) Introduce the adjustable blade in the slot of body and clamp it with the help of knob in the convenient position.
- (c) Place the working edge of the stock on one surface of the job and rotate the turret holding the blade so that the working edge of the blade coincides with another surface of the job. Fix the turret and read the angle.
- (d) Measure the angles of the sample pieces with the bevel protractor and record the reading in the proforma suggested.

### Observation Table:

Sr. No.	Notation of Angle	Vernier Bevel Protractor	Remarks
1	A		
2	B		
3	C		