

## Experiment No.11

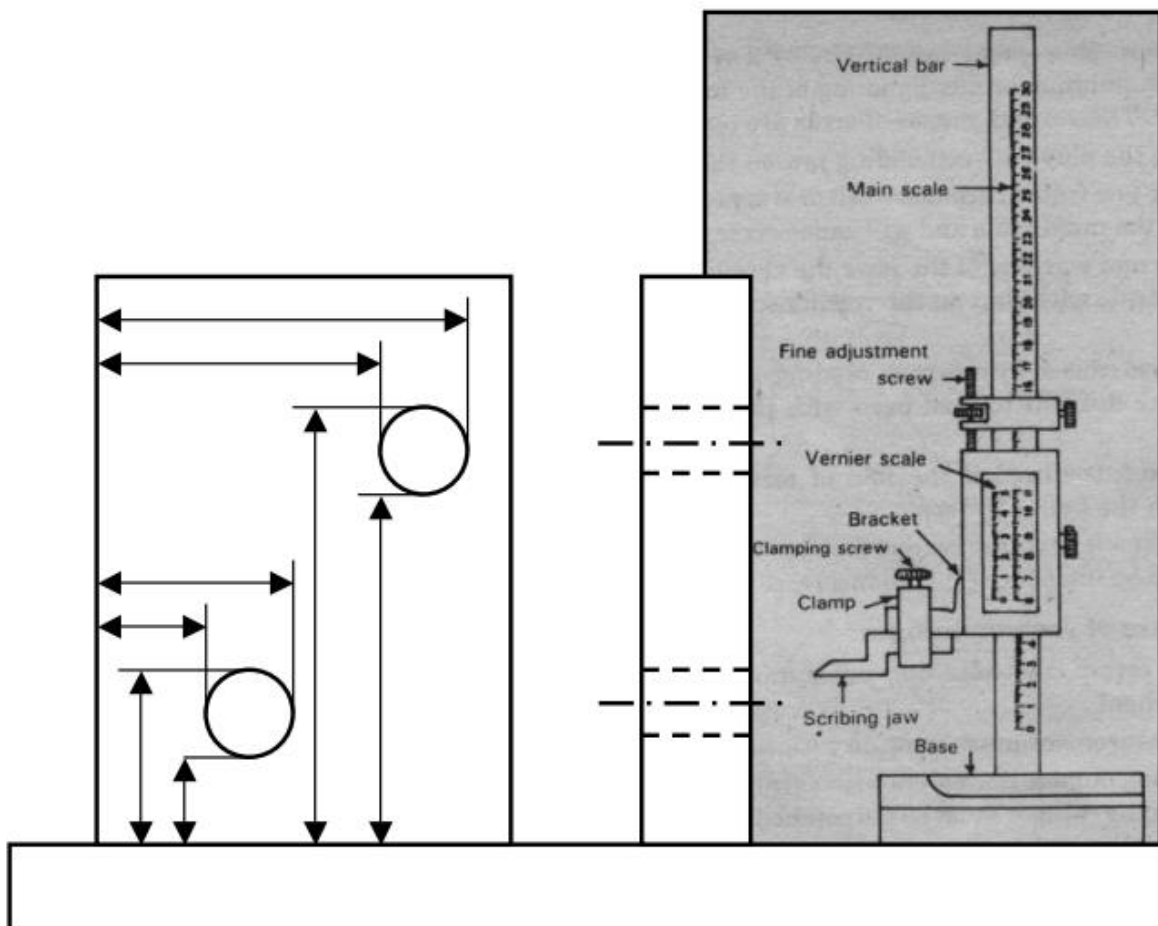
### MEASUREMENT OF CENTRAL DISTANCE BETWEEN TWO HOLES

**AIM:** To measure the central distance between the two holes of the template using Vernier height gauge.

#### MEASURING INSTRUMENTS & TOOLS:

- 1) Vernier height gauge, 3) Surface plate
- 2) Angle plate with clamps, 4) Bevel protractor

**THEORY:** Vernier height gauge will be used to measure and mark vertical distances above a reference surface with the help of knife edge or lever type dial indicator fitted to the measuring jaw. With this capability the utility of Vernier height gauge can be extended to measure the central distance between the two holes of a template. The template should have two adjacent sides corrected to right angle accurately, which will be the reference sides.



#### PROCEDURE:

1. The template sides were checked for 90° angle using a bevel protractor.

2. Any two sides at right angle were selected and the template was fixed to the angle plate so that one of the sides under consideration touching the surface plate.
3. The heights of the lowest and highest points of the two holes under consideration were found using vernier height gauge with reference to the surface plate.
4. The procedure was repeated and the heights of the same holes were measured with reference to the second side of the template.
5. All the readings were tabulated and central distance between the two holes was found by finding the coordinates of the same holes.

**PRECAUTIONS:**

1. Vernier height gauge should be set to read zero on the surface plate.
2. The template should be clamped properly to angle plate to ensure the plan of the plate perpendicular to the surface plate.
3. Care should be taken while seeing the coincidence of the knife edge with the edges of the holes.

**OBSERVATIONS:**

**REFERENCE SIDES OF TEMPLATE:**

S. No	Reference side	x <sub>1</sub> mm	x <sub>2</sub> mm	x <sub>3</sub> mm	x <sub>4</sub> mm	X <sub>1</sub> mm	X <sub>2</sub> mm	y <sub>1</sub> mm	y <sub>2</sub> mm	y <sub>3</sub> mm	y <sub>4</sub> mm	Y <sub>1</sub> mm	Y <sub>2</sub> mm

$$X_1 = \frac{x_1 + x_2}{2}$$

$$Y_1 = \frac{y_1 + y_2}{2}$$

$$X_2 = \frac{x_3 + x_4}{2}$$

$$Y_2 = \frac{y_3 + y_4}{2}$$

$$Distance = \sqrt{(X_2 - X_1)^2 + (Y_2 - Y_1)^2}$$