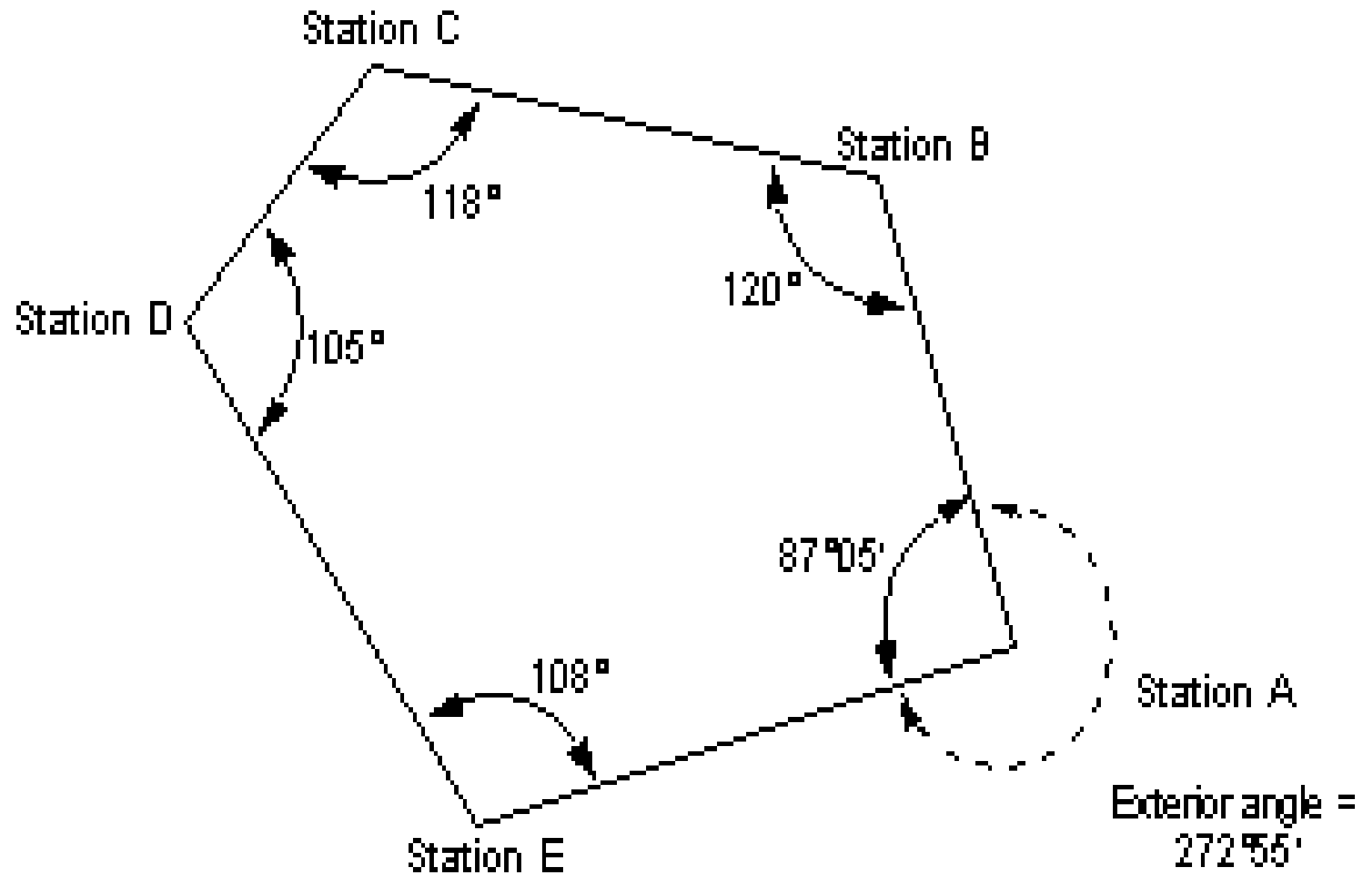


COMPASS SURVEYING

- Chain surveying can be used when the area to be surveyed is comparatively smaller and is fairly flat.
- But when the area is large in such cases chain surveying is not possible
- In Traversing the frame work consists of number of connected lines
- The lengths are measured by using tape or chain and angles are measured by using compass

Type of traverses

- 1) Open traverse
- 2) Closed traverse

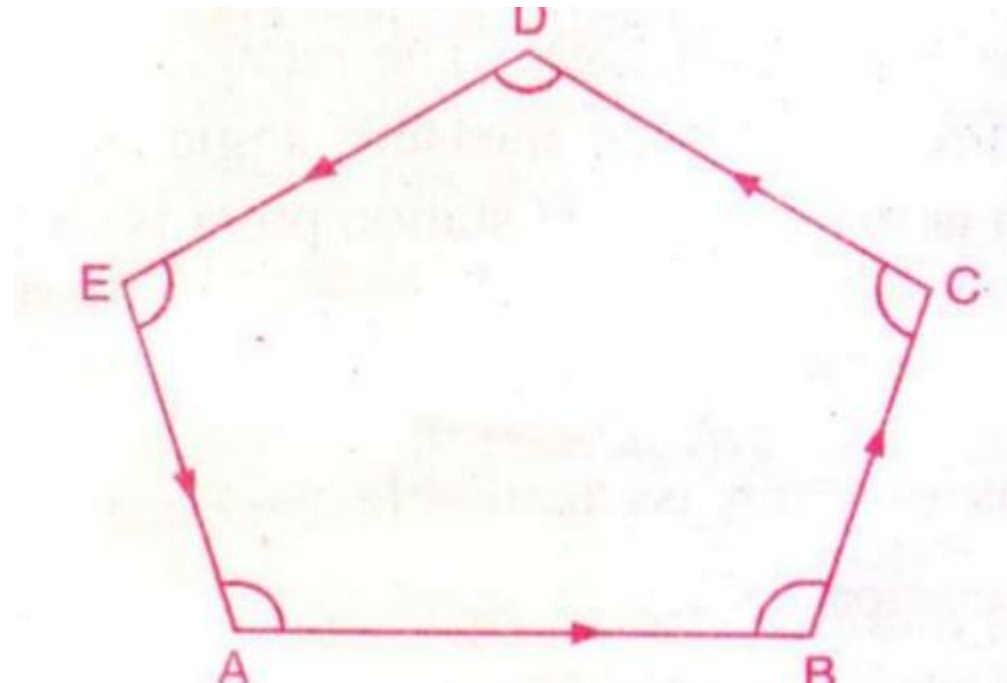


Principles of surveying

Principle of compass surveying involves a series of connected lines the magnetic bearing of the lines are measured by prismatic compass and distance are measured by using chain surveying

Compass surveying is not recommended for areas where local attraction is suspected due to local attraction like steel structures, magnetic e..t..c .

TRAVERSING



Types of compass

- ❖ Prismatic compass surveyor
- ❖ Surveyor compass

❖ Prismatic compass

Prismatic compass is a magnetic compass which consist of following parts

Cylindrical metal box having diameter 8-12cm.

It is protected from dust and rains e .t. c

❖ Pivot

Pivot is provided at the centre of compass and support freely suspended magnetic needle over it .

❖ Lifting pin and lever arm

lifting arm is provided just below the sight vane

When the sight vane is folded it press the lifting pin





❖Magnetic needle

Magnetic needle is the heart of the instrument

This needle measures angle of a line from magnetic meridian a the needle always pointed the north and south at the two ends of the needle when freely suspended on any support

❖Graduated circle

This is a aluminum graduated ring marked from 0 to 360 to measure all the possible angles of a line

❖Prism

Prism is used to read graduations on a ring and to take exact reading by compass

Object vane

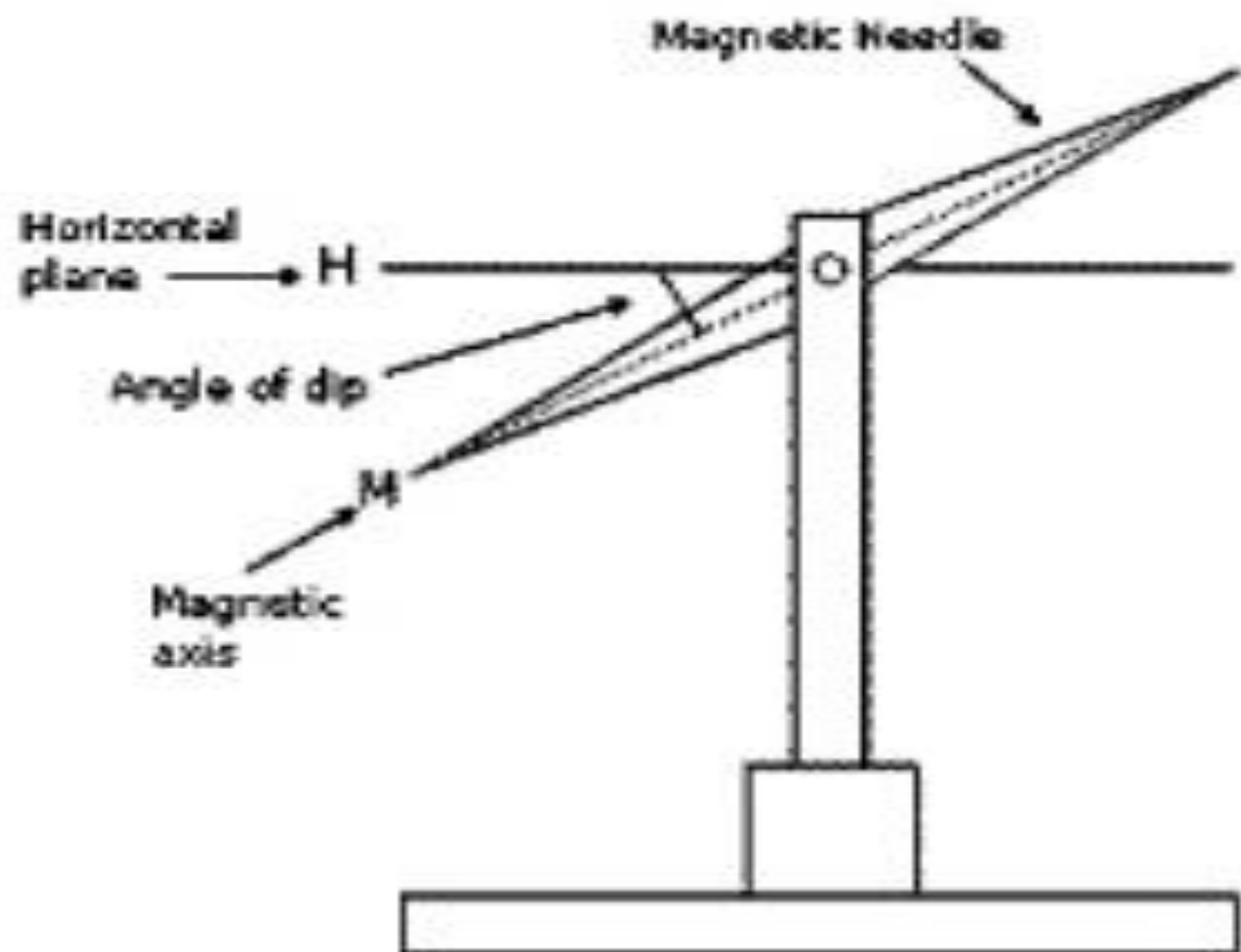
Object vane is diametrically opposite to the prism and eye vane the object vane carries a horse vane to sight the object by eye vane

❖Eye vane

Eye vane a fine slit is provided with eye hole at the bottom to bisect the object from the slight and to take reading simultaneously from the eye hole

❖Glass cover

It covers the instrument from dust and wind e. t. c



The angle $\angle HOM$ between the horizontal plane HO and the axis of freely suspended magnetic needle MO is Angle of Dip or Inclination

Working of prismatic compass

when the needle of compass suspended freely .its always points towards north ,there fore all the angles measured now are said to north oriented (magnetic meridian)

The horizontal angle made by a survey line with reference to magnetic meridian in clockwise direction is called bearing of the line

Temporary adjustments of compass

Centering

Leveling

Focusing

Centering : it is the process of placing the compass exactly over the station where the bearing is to be determine .

The centering is checked by dropping a small pebble or plum bob

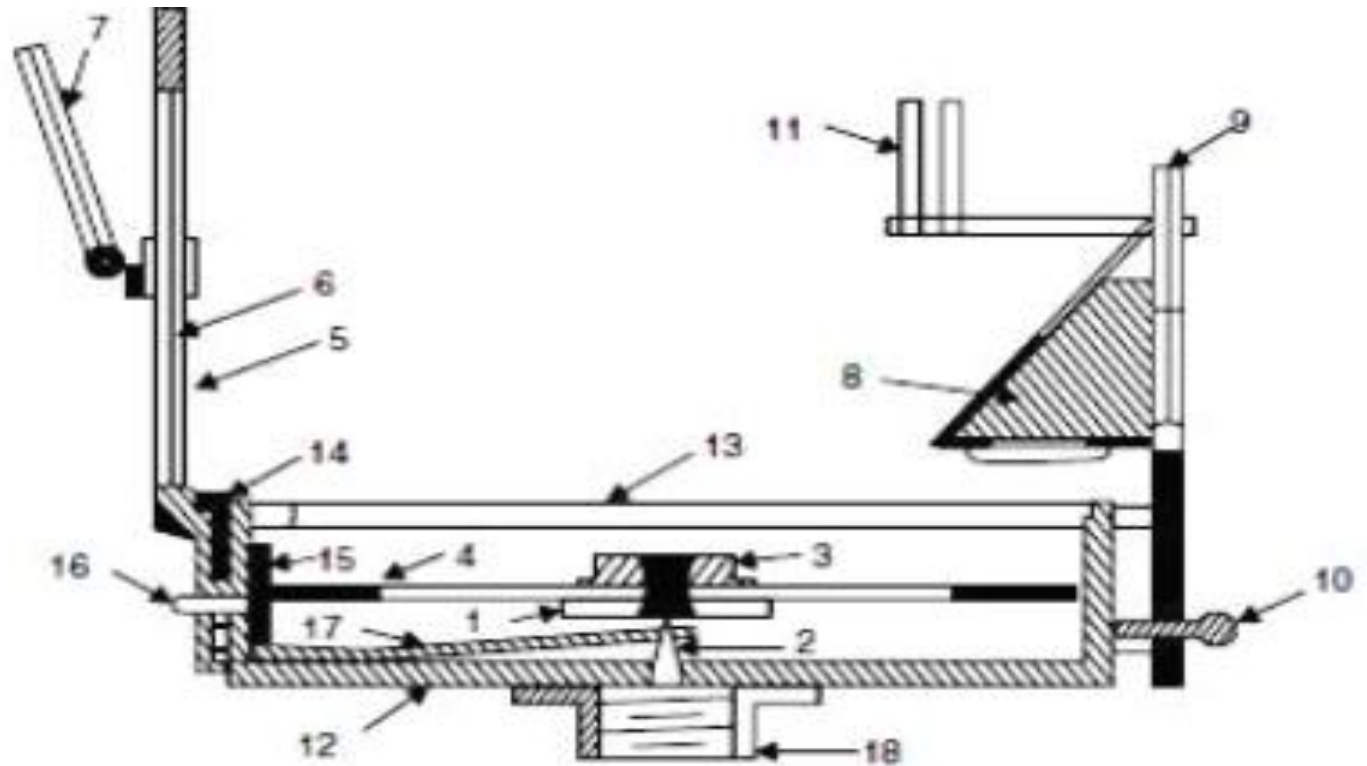
Leveling :leveling of the compass is done aim to free swimming the graduated circular ring of the prismatic compass

If not ball and socket is should be adjusted

Focusing:

Prism is move up and down in its slide till the graduations of the aluminum ring are clear and sharp





1. Needle
2. Pivot
3. Agate cap
4. Graduated disc
5. Slit metal frame
6. Horse hair
7. Mirror
8. Reflecting prism with cap
9. Eye vane

10. Focussing stud
11. Dark sunglasses
12. Box
13. Glass cover
14. Lifting pin
15. Light spring
16. Brake pin or knob
17. Lifting lever
18. Support to fit on tripod

The Prismatic Compass

Observing bearing of a line

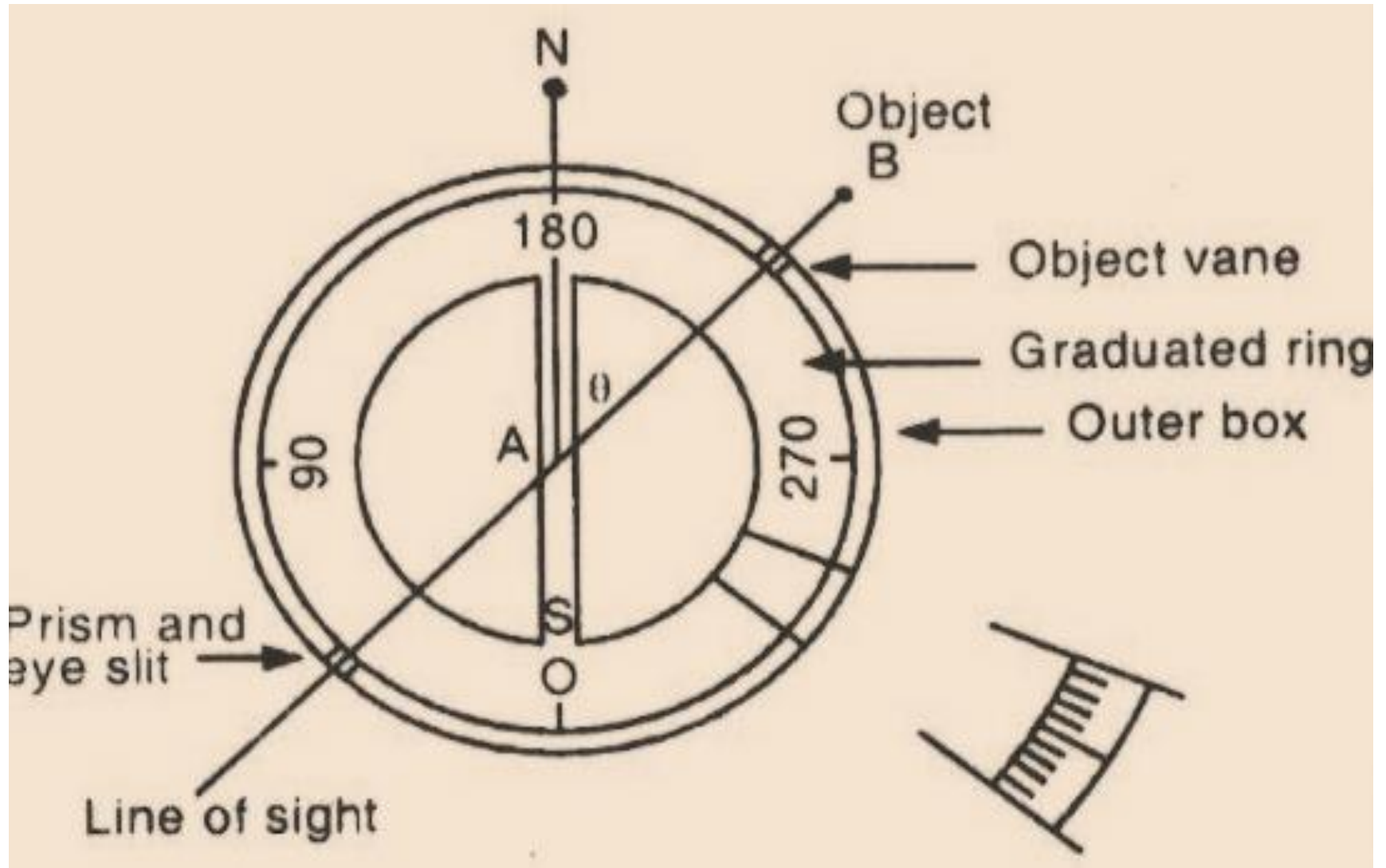
Consider a line AB of which the magnetic bearing is to be observed

Let the ranging rod be fixed at a line B in the line AB and the compass is centered on A

Turn the compass in the line AB

When the B is bisecting the vertical hair i.e when the ranging rod at B becomes in line in the sight of eye vane and the vertical hair i. e when the ranging rod at B becomes in line with the sight of eye vane and the vertical hair of the object vane, the reading under the vertical hair through the prism is taken ,which gives the bearing of line AB.

Prismatic compass



Designation of bearings

The bearings are designated in the following system

Whole circle bearing (W.C.B)

Quadrantal bearing (Q.B)

Whole circle bearing

The bearing of a line measured with reference to magnetic meridian in clockwise directions

here the angles lies between 0° to 360°

The quadrantal starts from north and progress in clockwise direction

First quadrant is lies between 0° to 90°

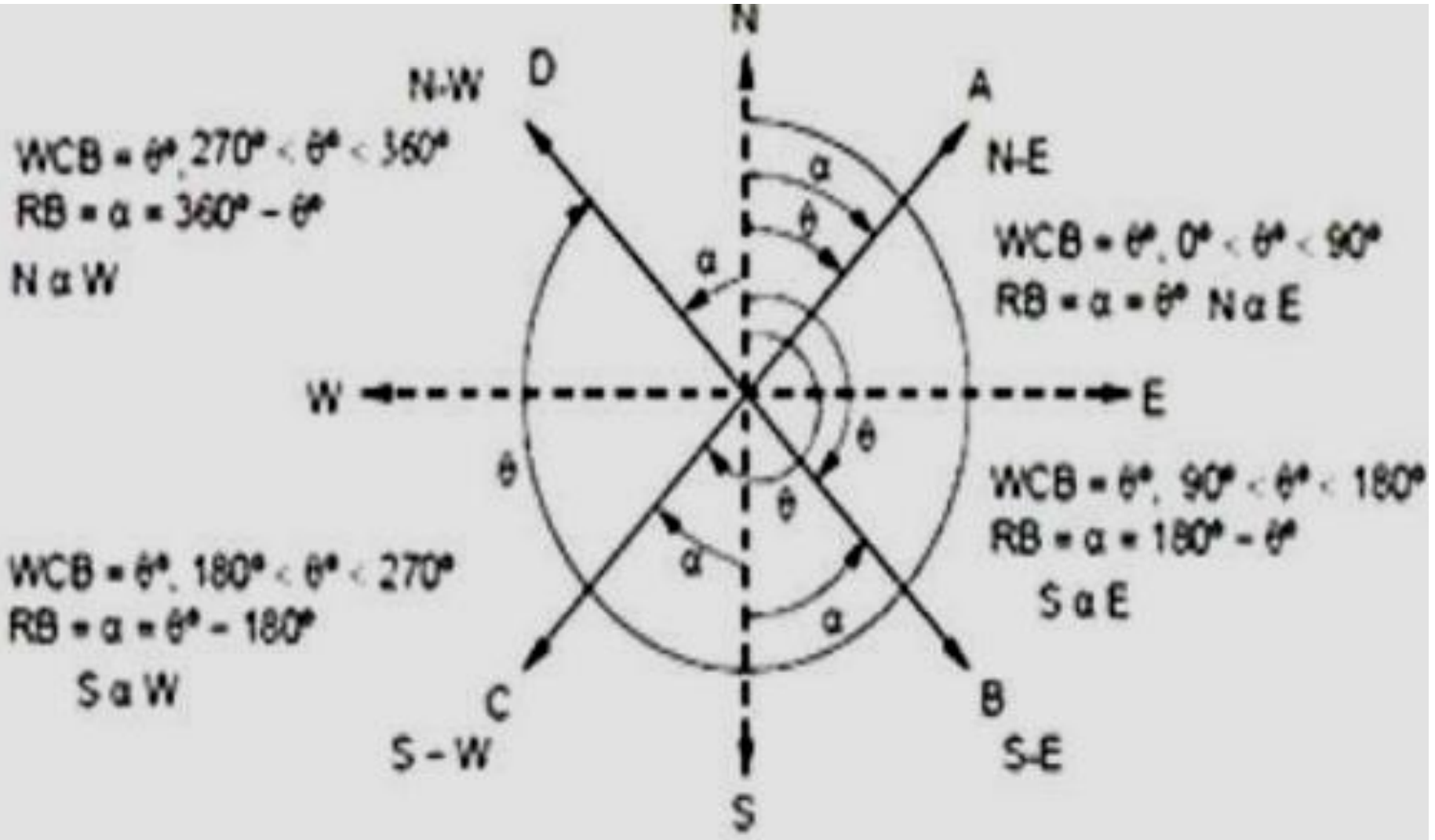
Second quadrant is lies between 90° to 180°

Third quadrant is lies between 180° to 270°

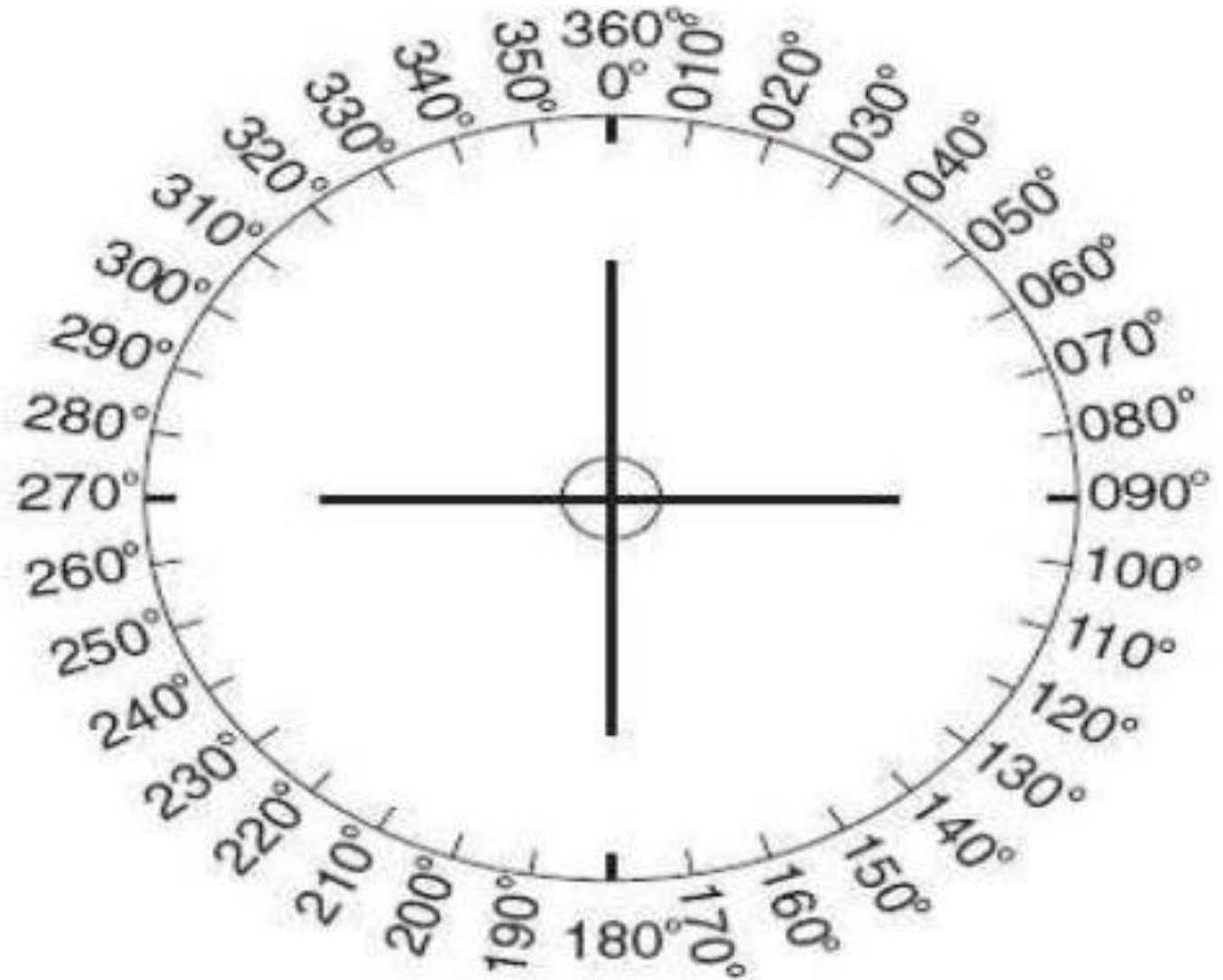
Fourth quadrant is lies between 270° to 360°



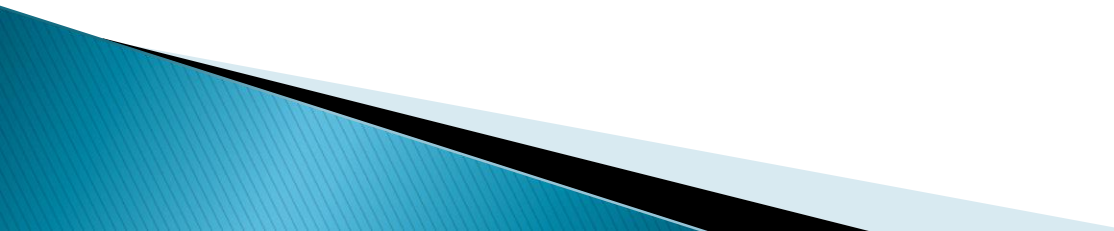
Whole circle bearing (W.C.B)



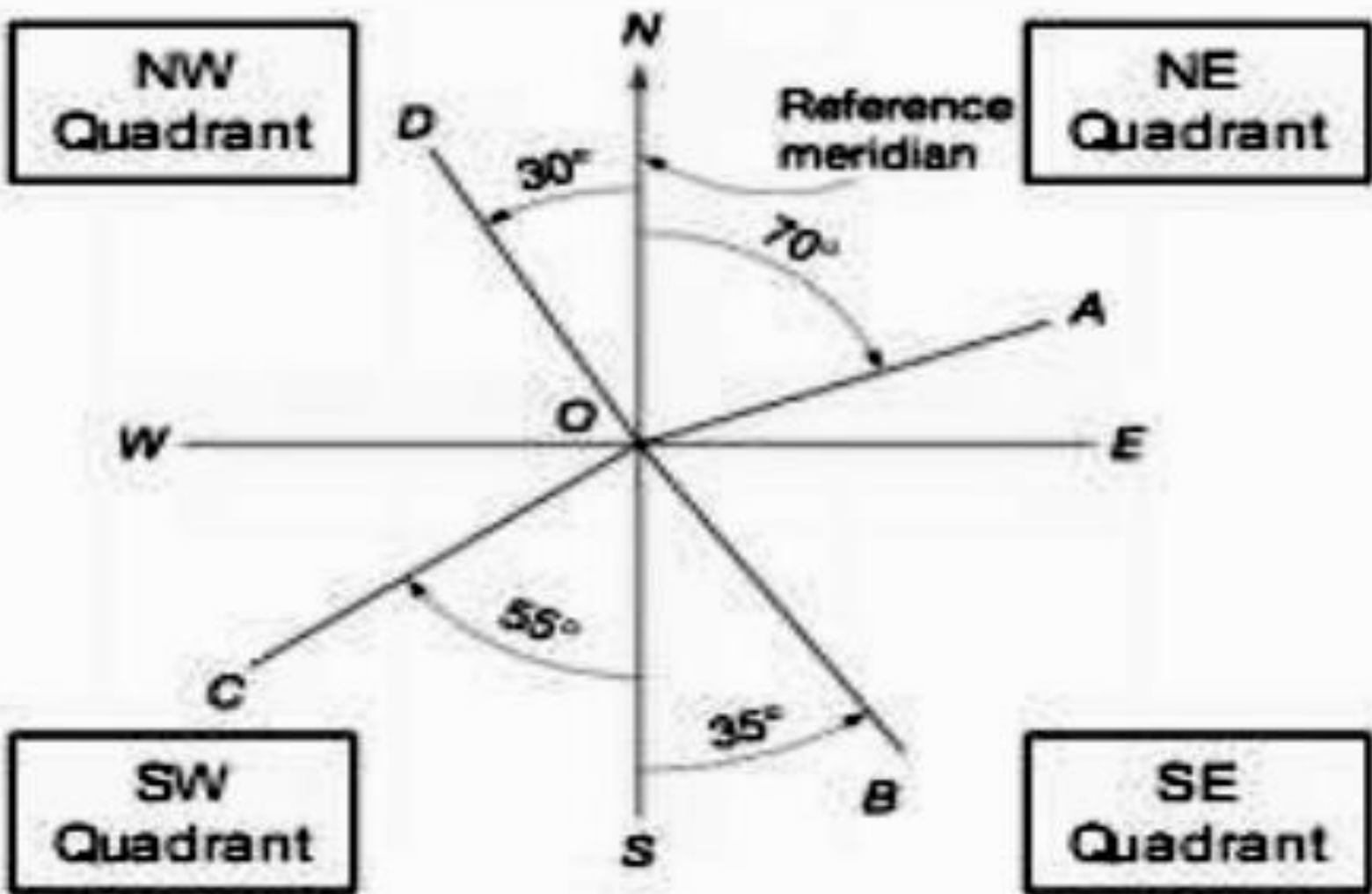
Whole circle bearing (W.C.B)



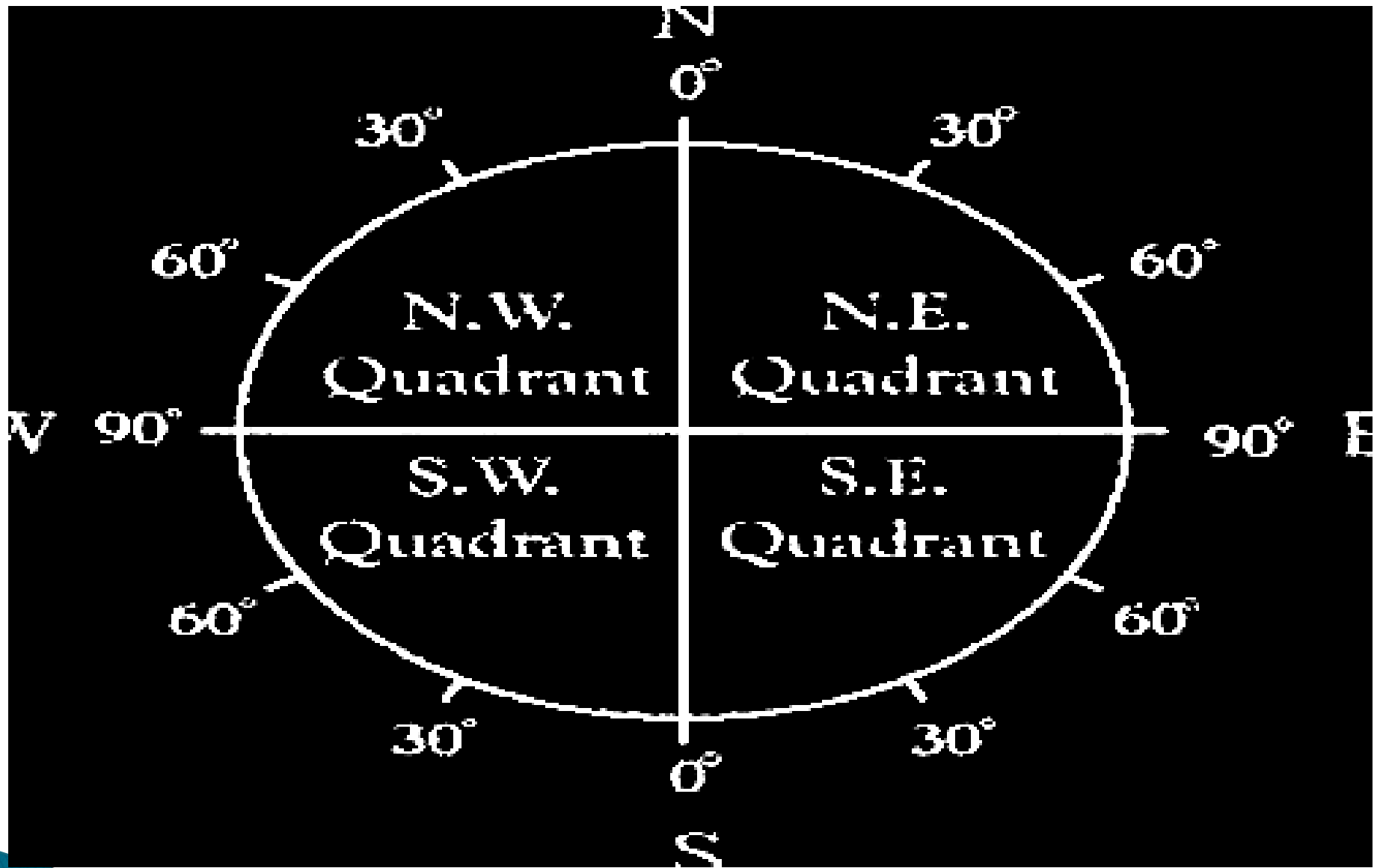
Quadrant bearing (Q.B)

- ❖ In this system bearings of lines are measured with reference to north or south which ever is closer to given survey line
 - ❖ Here the measurement of angles can be done both in clockwise or anticlockwise direction
 - ❖ When the whole circle bearing is converted to quadrantal bearing then it is called as reduced bearing
 - ❖ Thus reduced bearing is similar to quadrantal bearing
 - ❖ Here the values lies between 0^0 to 90^0
- 

Reduced bearing (Q.B)



Reduced bearing (Q.B)



Conversion of W.C.B to Q.B

Case	WCB between	R.B.	QUADRANT
1	0° TO 90°	WCB	N-E
2	90° TO -180°	$180 - \text{WCB}$	S-E
3	180° TO -270°	$\text{WCB} - 180^{\circ}$	S-W
4	270° TO 360°	$360 - \text{WCB}$	N-W

Conversion of Q.B to W.C.B

Case	R.B in quadrant	Rule of W.C.B.	W.C.B between
1	N-E	$WCB=R.B$	0° TO 90°
2	S-E	$WCB = 180-R.B$	90° TO -180°
3	S-W	$WCB = R.B+180$	180° TO -270°
4	N-W	$WCB = 360-R.B$	270° TO 360°

Fore bearing and back bearing

FORE BEARING (F.B)

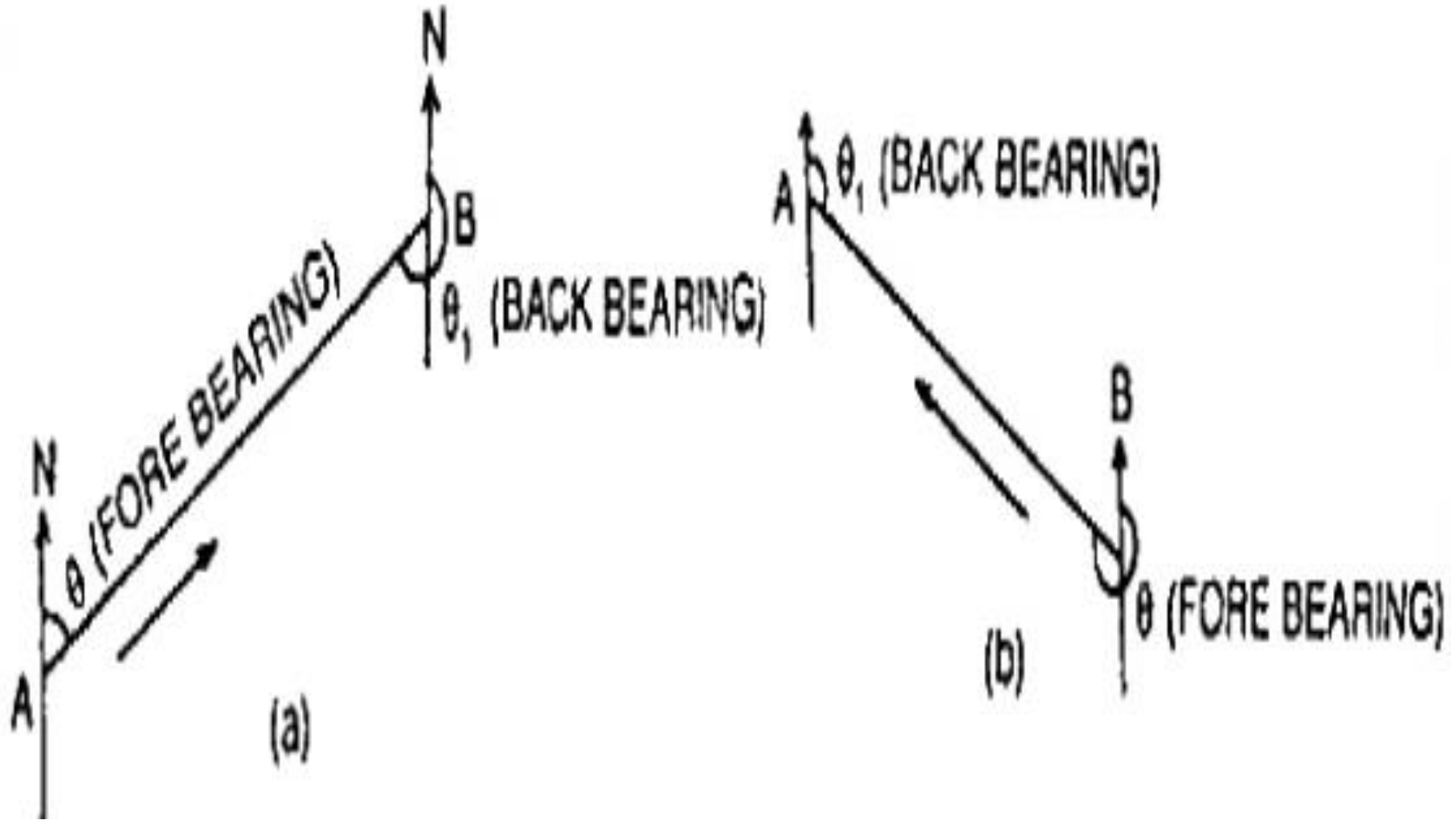
➤ The bearing of a line measured in forward direction of a survey line is called fore bearing (F.B).

$$\text{➤ F.B} = \text{BACK BEARING} \pm 180^\circ$$

BACK BEARING (B.B)

➤ The bearing of a line measured in direction opposite of a survey line is called back bearing (B.B)

Fore bearing and back bearing



- ❖ The sum of interior angles is equal to $(2n-4) * 90^{\circ} = 540$
- ❖ The sum of exterior angles is equal to $(2n+4) * 90^{\circ} = 540$