POLAR ZENITHAL STEREOGRAPHIC PROJECTION

Principles:

In this Projection a 2 – dimensional plane of projection touches the generating globe at either of the poles. It is a perspective projection, with the source of light lying at the pole diametrically opposite to one at which the projection plane touches the generating globe. The parallels are projected as concentric circles of varying radius while the meridians are projected as straight lines radiating from the poles.

Properties:

i.   Parallels are represented by concentric circles of varying radii.
ii.   Inter- parallel spacing gradually increases toward the equator.
iii.   Meridians are straight lines radiating from the poles at true azimuth apart.
iv.   The direction between the two points is maintained.
v.   At any point, the radial scale is equal to the tangential scale.
vi.   It is an orthomorphic projection, i.e., the shape of a map is truly maintained.
vii.   It is commonly used for the map of the world in hemispheres.

Construction

i.   A pair of straight lines intersecting at right angles are drawn to represent the four cardinal meridians (0°, 90°E, 180°, 90°W).
ii.   From the point of intersection, concentric circles are drawn with r_ϕ to represent the parallels.
iii. With the help of a protractor held at the pole, division points are marked at the required interval of angle.
iv.   Straight lines are drawn through these points joining the poles to represent the meridians.
v.   The graticules are then properly labelled

1. **Draw the graticules of Polar Zenithal stereographic projection for the map of Antarctica extending up to 50° south latitude and 0°- 180° E/W longitude at an interval of 10° on a scale of 1 : 60000000.**

Calculation:

Step -1: Radius of the generating globe reduce to the given Scale.

$$R = \frac{\text{Radius of the actual earth}}{\text{Nominal Scale}}$$

$$= \frac{64000000}{60000000}$$

$$= 10.60 \text{cm}.$$

Step-2: Selected Parallels are--- 50° S, 60° S, 70° S, 80° S, 90° S,

Step-3: Radius of the selected parallels have been computed in tabular form with the formula -
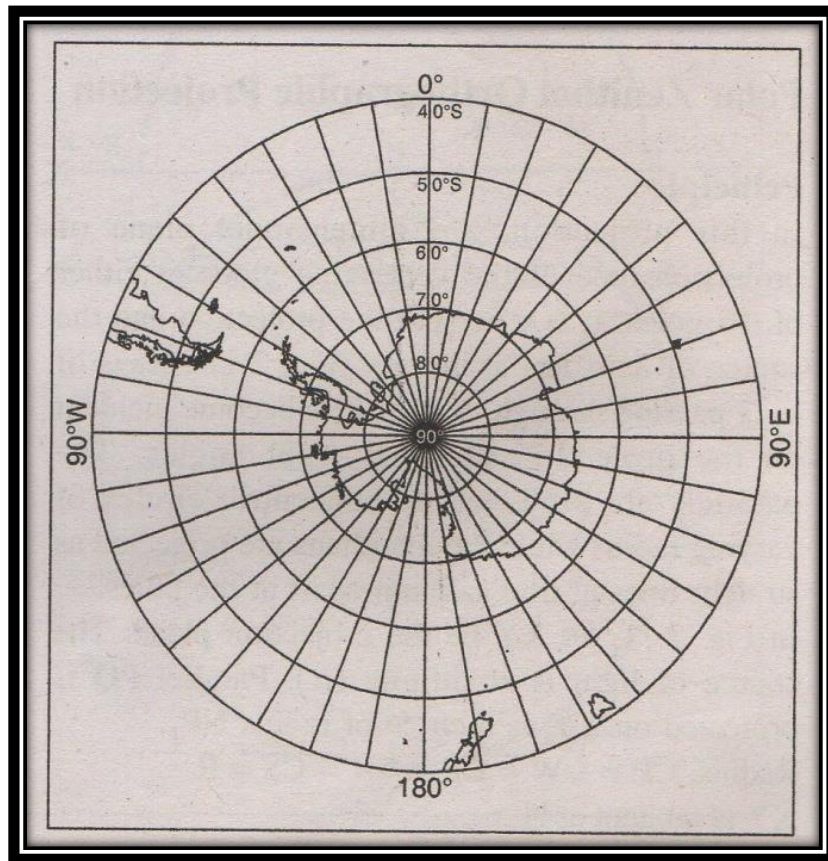
$$2R \times \tan \times \frac{(90°-\theta)}{2}$$

Φ N ⟋ φ r	50°	60°	70°	80°	90°
$\tan \times \frac{(90°-\theta)}{2}$	0.3639	0.2679	0.1763	0.0874	0
2R in cm	21.2	21.2	21.2	21.2	21.2
$2R \times \tan \times \frac{(90°-\theta)}{2}$	7.7146	5.6794	3.7375	1.8528	0
Working Unit	7.71	5.68	3.74	1.85	0

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Showing the Map of Antarctica in Southern Hemisphere

R.F. 1: 60000000

SCALE
1 cm. to 600 km.

| 600 km. | 300 km. | 0 | 600 | 1200 | 1800 | 2400 | 3000 km. |