SVG 318   INTRODUCTION TO GEODESY

INSTRUCTIONS: Answer any **four** questions   Time Allowed: **2½ Hours**

Q1 (a) What is Geodesy?

(b) State the aims of Geodesy

(c) State the methods used in providing Geodetic controls

(d) State the two main properties of Geodesic

Q.2   Prove the following geodetic identities where a is semi-major axis and b is semi-minor axis, f is geometric flattening and e is first eccentricity of the ellipsoid.

(a) $e^2 = 2f - f^2$

(b) $\sqrt{(1 - e^2)} = (1 - f)$

(c) $(1 - e^2) = b^2/a^2$

(d) $(a^2 - b^2)/b^2 = e^2/(1 - e^2)$

Q.3 Write short notes with diagrams to explain the following terms:

(a) Geoid

(b) Normal Section

(c) Geodesic

(d) Geodetic Datum

(e) Geodetic Latitude

(f) Radii of Curvature

Q.4 (a) Use the Geodetic Space Rectangular coordinates below

$X = (N + h)Cos\phi Cos\lambda$

$Y = (N + h)Cos\phi Sin\lambda$

$Z = \{N(1 - e^2) + h\}Sin\phi$

Where N is the radius of Curvature in the Prime Vertical

ϕ is the Geodetic Latitude and λ is Geodetic Longitude and e is the eccentricity

and h is the ellipsoidal height.

Derive the equation $h = \frac{Z}{Sin\phi} - N(1 - e^2)$

Q.5   Use diagrams to explain the following concepts in Geodetic Surveying

(a) Angular Separation between reciprocal Normal Sections

(b) Maximum Distance Separation between reciprocal Normal Sections

(c) If two points A and B are on the ellipsoid and are separated by a distance 100.028m, and lie on latitudes 23° 15'58" and 68° 48'24" respectively with the line AB having and azimuth of 45° 11'56", Calculate the angular separation between the reciprocal normal sections where a = 6378160m and 1/f =298.25