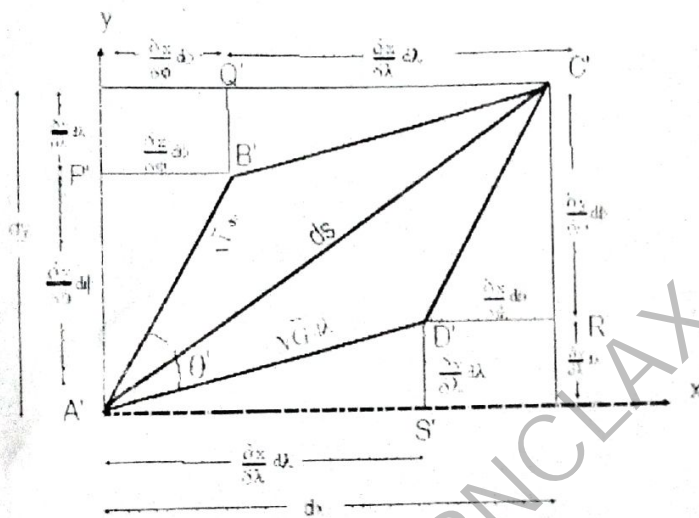


FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ENVIRONMENTAL SCIENCES
DEPARTMENT OF SURVEYING AND GEOINFORMATICS
COURSE TITLE: MAP PROJECTION CODE: SVG 319 UNITS: 2
HARMATTAN SEMESTER 2018/2019 SESSION TIME: 3HRS

INSTRUCTION: Answer question one and any other three questions

1a. The diagram below shows the projection of a quadrilateral onto a plane, use the details in the diagram to derive the first Gaussian Fundamental Quantities. **(10mks)**



1b. Using the First Gaussian Fundamental Quantities (E, F, G), derive the following:

- i. Scale Distortion along the meridian ($\mu\phi$). **(6mks)**
- ii. Scale Distortion along the parallel circle ($\mu\lambda$). **(6mks)**

2a. Trace the historical development of maps detailing the major achievements of the Ancient Ages, Middle Ages and Modern Era. **(9mks)**

2b. With the aid of diagrams, briefly describe the 3 types of perspective azimuthal projection **(7mks)**

3. With the aid of an illustrative diagram where necessary, Discuss the three (3) common projections
NB: You must detail the tangent and secant case as well as the normal and transverse aspect for each of the projections. (16mks)

4a. Discuss the Nigeria (modified) Transverse Mercator Projection detailing its characteristics and advantages. **(11mks)**

4b. The shape, size and surface of the ellipsoid can be described using five (5) major quantities.

List and write the equations for each of these quantities. **(5mks)**

5a. Compute grid convergence at a point with latitude $11^{\circ}07'28.7''$ N and longitude $9^{\circ}39'28.942''$ E **(10mks)**

5b. Define the following:

- i. Map projection **(1.5mks)**
- ii. Geodetic Azimuth **(1.5mks)**
- iii. Grid convergence **(1.5mks)**
- iv. Grid bearing **(1.5mks)**

6a. Map projection aims at producing a perfect map which is one without distortion and also satisfies the cartographic conditions. Enumerate these cartographic conditions. **(8.5mks)**

6b. In choosing a map projection there are three (3) major points to consider. Discuss with examples. **(7.5mks)**