Menoufia University
Faculty of Engineering,
Shebin El-Kom
Second Semester Exam
Academic Year: 2015 / 2016
Department: Civil Engineering

Minufiya University

Diplom level course, Public Works

Subject/Code: Geometric Geodetic Surveying / CVE 535

Date :   20 / 6 / 2016
Time Allowed :   3 Hours

Answer all Questions [100 Marks]   **[Marks]**

Question (1)   **[20]**

The shape parameters of a reference ellipsoid are: a = 6378 136.8 m and f = 1 / 298.267. Compute the 3D-Cartesian coordinates of a point having the following geodetic coordinates:

φ = 31° 38' 51" N , λ = 95° 18' 09" E , h = 117.83 m

Question (2)   **[20]**

Station A has the following geodetic coordinates (with respect to a sphere having a radius of 6375.149 km):

φ = 55° 08' 36" S , λ = 127° 13' 19" E , h = 39.758 m

Compute the 3D-Cartesian coordinates of that point.

Question (3)   **[20]**

Station D has the following geodetic coordinates with respect to a reference ellipsoid:

φ = 46° 25' 49" S , λ = 156° 37' 16" W , h = 178.002 m

This ellipsoid has the parameters: a = 6378.135 km and f = 1 / 298.001. Compute the geodetic coordinates of that point with respect to a spherical surface having a radius of 6367.035 km.

Question (4)   **[20]**

Datum	Type	Radius (m)	φ	λ	h
Sphere 1	Geocentric	6371 123	27° 48' 13" N	33° 17' 29" E	128.56 m
Sphere 2	Regional	6370 017	27° 48' 20" N	33° 17' 21" E	113.74 m

The table above gives the geodetic coordinates of station C, relative to two different spherical datums, with type and radius as shown. Compute the shift components between them.

Question (5)   **[20]**

If the shape parameters of the WGS-84 reference ellipsoid are:

a = 6378 137.000 m   ,   b = 6356 752.298 m

And the geodetic coordinates of point B with respect to that ellipsoid are:

φ = 28° 07' 36" S , λ = 10° 12' 49" W , h = 13.998 m

Compute the geodetic coordinates of B relative to another geocentric ellipsoid which has the following parameters:

a = 6378 141.000 m   ,   f = 1 / 298.251