

KATHMANDU UNIVERSITY  
End Semester Examination [C]  
May/June, 2019

Marks Scored:

Level : B.E.  
Year : III

Course : GEOM 317  
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No. :

Date : 06 JUN 2019

SECTION "A"

[20 Q × 0.5 = 10 marks]

Encircle the most appropriate answer.

- Based on Geodetic standard of Nepal, prescribed distance between fourth order control point is:  
a. 200 meters to 2 Kilometer  
b. Less than 200 meters  
c. 2 Kilometers to 3 Kilometers  
d. More than 3 Kilometers
- VRS stands for:  
a. Virtual Reference Station  
b. Various Reference Station  
c. Virtual Reference System  
d. Various Reference System
- Molodensky Transformation is applicable when \_\_\_\_\_  
a. the coordinate axes are parallel to each other  
b. the coordinate axes are perpendicular to each other  
c. the coordinate axes are at certain angle to each other and the angle is known value  
d. scale factor is more than 1
- The line of longitude is also called:  
a. Latitude  
b. Meridian  
c. Arctic circle  
d. Small circle
- 23.43677° latitude lies at:  
a. North Pole  
b. Equator  
c. South Pole  
d. Tropic of cancer
- The mathematical representation of surface of the Earth is:  
a. Geoid  
b. Mean Sea Level  
c. Ellipsoid  
d. Sphere
- A level surface is the surface that .....  
a. is flat  
b. has uniform slope  
c. has constant gravity potential  
d. is stable
- The surface with reference to which measurements are taken is known as:  
a. Datum  
b. Control point  
c. Mean Sea Level  
d. Benchmark
- The value of acceleration due to gravity (g) at equator is:  
a. 9.78 m/s<sup>2</sup>  
b. 9.8 m/s<sup>2</sup>  
c. 9.83 m/s<sup>2</sup>  
d. 9.85m/s<sup>2</sup>
- Gravimetry refers to:  
a. Measurement of gravitational anomalies  
b. Measurement of the strength of gravitational field through measurement of gravity value  
c. Measurement of adverse effects of earth's gravity on satellites  
d. Measurement of gravitational pull among heavenly bodies

11. Which is the following statement true?
  - a. Acceleration due to gravity is directly proportional to the radius of the Earth.
  - b. Acceleration due to gravity is inversely proportional to the square of radius of the Earth.
  - c. No change of value of acceleration due to gravity in any point on the Earth surface.
  - d. Equal value of acceleration due to gravity in Pole and Equator.
  
12. Outside the attracting mass, the potential of gravitation exhibits:
  - a. Harmonic Function
  - b. Cubic Function
  - c. Parabolic Function
  - d. Linear Function
  
13. The condition to be fulfilled while measuring gravity is:
  - a. The gravimeter and level surface must be parallel to each other.
  - b. The gravimeter and level surface must be perpendicular to each other.
  - c. The gravimeter and level surface must be concurrent.
  - d. The gravimeter and level surface must be overlapping.
  
14. Geodetic datum used by Survey Department for surveying and mapping purpose in Nepal is:
  - a. WGS 84
  - b. Everest 1830
  - c. NAD
  - d. Clark
  
15. The difference in true and magnetic North is known as:
  - a. Magnetic declination
  - b. Convergence
  - c. Deflection of vertical angle
  - d. Deflection of horizontal angle
  
16. Hermert's Transformation has:
  - a. 3 parameters
  - b. 6 parameters
  - c. 11 parameters
  - d. 7 parameters
  
17. According to principle of Least Square Adjustment, residual is.....
  - a. Zero
  - b. minimum
  - c. maximum
  - d. unpredictable
  
18. The extent of geodetic surveying is .....
  - a. more than 180 Sq. Km.
  - b. more than 195 Sq. Km.
  - c. less than 170 Sq. Km.
  - d. more than 160 Sq. Km.
  
19. Combined correction of curvature and refraction is given by:
  - a.  $0.0685 D^2$
  - b.  $0.0785 D^2$
  - c.  $0.0885 D^2$
  - d.  $0.0985 D^2$
  
20. Semi minor axis of WGS 1984 datum is:
  - a. 6377246.340 meters
  - b. 6354213.251 meters
  - c. 6356752.314 meters
  - d. 6355762.123 meters

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F. M. : 40

SECTION "B"

[8 Q. × 5 = 40 marks]

*Average Radius of the Earth= 6371 Km*  
*Semi-major axis of WGS 84 Ellipsoid= 6378137.0 meters*  
*Flattening factor of WGS84= 298.257223563*  
*Semi-major axis of Everest 1830 Ellipsoid= 6377276.345m*  
*Flattening factor of Everest 1830= 300.8017*

Attempt ANY EIGHT questions.

1. Define Physical Geodesy from a perspective of Geomatics Engineering. Write the main functions of it.
2. What do you understand by ITRF? Write its importance in Geodetic Science.
3. WGS 84 is widely used as Datum for GNSS systems. However, in Nepal we rely on Everest 1830. What can be the reasons? Describe the pros and cons of local and global datum.
4. What are the things to be considered by a nation while determining suitable projection system? Briefly justify your answer.
5. Compare and contrast between Ellipsoidal and Geoidal height. Also illustrate them using necessary diagram.
6. Briefly explain the properties of spherical triangle.
7. Write in detail the role of Geodesy in tectonic movement detection and modelling.
8. What do you understand by relative and absolute gravity measurement? Derive necessary expressions for relative gravity measurement.
9. Write the necessary formulas and methods used to transform Geographic coordinates to Geocentric coordinates.
10. In a triangle ABC having angle  $A = 63.132^\circ$ , angle  $B = 62.139^\circ$  and angle  $C = 54.752^\circ$  having equal weight. Adjust the triangle by using Least Square Adjustment method.

