Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2024

NAME OF THE BRANCH
Semester
Subject code & Subject Title
(Regulation 2019)

Time:3 hrs GI5404 - Geodesy Max. Marks: 100

CO1	Understand the Geometry of the earth, Gravity and its relationship with nature
CO2	Understand the procedure for establishing horizontal and vertical Geodetic control and its adjustment procedure.
CO3	Determination of Azimuth, Latitude, Longitude and Time by Geodetic astronomical observations.
CO4	Provide the various aspects of Geometric and Physical Geodesy.
CO5	Inculcate the different height systems used to solve the field problems.

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10x2=20Marks)
(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	Depict various reference surfaces and their relationship between them with a neat sketch.	2	CO1	L4
2	Write the advantages and limitations of local and international spheroids.	2	CO1	L4
3	Write any four characteristics of Geodesic	2	CO2	L1
4	With a neat sketch, indicate the deflection of vertical	2	CO2	L2
5	Define gravity and its components	2	CO3	L2
6	What is Eotvos correction? When is it applied?	2	CO3	L3
7	Compare the accuracy requirements of first, second and third order triangulation in geodetic control	2	CO4	L4
8	Distinguish Normal height from Dynamic height.	2	CO4	L4
9	Write the three important rules adopted on spherical triangle in astronomy	2	CO5	L2
10	Differentiate Solar and Sidereal time systems	2	CO5	L4

PART- B (5x 13=65Marks)
(Restrict to a maximum of 2 subdivisions)

Q. No.	Questions	Marks	CO	BL
11 (a) i)	Describe the historical development of geodesy, mentioning key figures and their contributions.	7	CO1	L2
ii)	What is direct and indirect problems in Geodesy and Explain the Observations helpful in solving those problems.	6	CO1	L1
	OR			
11 (b) i)	Discuss the concept of Interferometric Synthetic Aperture Radar (InSAR) and its role in geodesy.	7	CO1	L2
ii)	Describe the developments in Modern era and their significance on accuracy achieved in Geodetic measurements.	6	CO1	L1
12 (a) i)	Derive the relationships of Geodetic, Geocentric and Reduced latitudes with rectangular coordinates	8	CO2	L3

12 (b) i)	Derive expression for calculating the rectangular coordinates of a point on ellipsoid, given the Geocentric Latitude of the point	8	CO2	L3
ii)	From fundamental geometry of Ellipsoid, derive the relationship $e^2=2f-f^2$	5	CO2	L3
13 (a)	Derive the expressions for determination of absolute and relative gravity using free fall, rise and fall methods and simple pendulum methods	13	CO3	L3
	OR			
13 (b)	Discuss the important of various types of reductions applied on gravity measurements	13	CO3	L3
14 (a) i)	Compute horizontal ground distance between points A and B. The coordinate of A is 12° 44' 30" N, 80° 22' 10" E, 55.012 m and the Coordinate of B is 14° 23' 44" N, 78° 12' 04" E, 840.162m.	8	CO4	L3
ii)	The Geopotential number at Points P and Q are calculated as 4000 k.gal.m and 5500 k.gal.m. Given the dynamic height of P as 3200m, calculate the dynamic height of Q to the mm.	5	CO4	L3
	OR			
14 (b)	Derive the expressions for corrections of Orthometric height, Normal height, Dynamic height. How does Geoidal height can be used to express the elevation of a location?	13	CO4	L3
15 (a)	Explain various coordinate systems adopted in Geodetic Astronomy. Evaluate them with reference observer position dependency	13	CO5	L1
	OR			
15 (b) i)	Classify the stars based on their path along celestial sphere and explain the governing conditions.	6	CO5	L1
ii)	Describe various types of Star Catalogue and Star Almanac. What are the parameters derived from these records in field astronomy	7	CO5	L1

PART- C (1x 15=15Marks)

(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16.	An observation programme for a stars with a declination of 88° 10' and 75° 40' is to be planned for astronomical observations at Anna University. Develop an observation plan by determining the following a. Suitability of star for observation programme b. Rise and Set times and Azimuth of the Star at rise and set c. Zenith, Azimuth and Hour Angle of the Star at Culminations d. Altitude of Star and time of observation during Prime Vertical Crossing of star e. Azimuth, Altitude and Time at the instance of elongation of star	15	CO5	L5