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

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)
B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2025

GEOINFORMATICS ENGINEERING
Semester IV
GI23404 & GEODESY
(Regulation 2023)

Time:3hrs Max.Marks: 100

CO1	Understand and apply the fundamental principles of geodesy to solve geodetic problems in various disciplines.
CO2	Apply geometric geodesy concepts to solve practical problems related to coordinate conversions and geodetic measurements.
CO3	Analyze and interpret astronomical observations using celestial coordinate systems and time systems for geodetic applications
CO4	Utilize physical geodesy knowledge, such as geopotential theory and anomalies to analyze Earth's gravity field and determine geoid heights.
CO5	Apply these concepts of Geodesy in surveying, mapping, navigation, and environmental studies.

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	Which of the observations are used to solve problems in geodesy?	2	1	L3
2	Differentiate between WGS84 and Everest (1956) ellipsoids with respect to their geodetic characteristics.	2	1	L3
3	Define Reduced latitude and its applications.	2	2	L2
4	What parameters are used in the Helmert transformation?	2	2	L1
5	Define and Draw Vertical Circle and hour circle on Celestial Sphere.	2	3	L2
6	Classify a star with respect to its declination, if the observer is located at 13° N latitude?	2	3	L3
7	What on the Gravity Anomaly?	2	4	L1
8	The length of the pendulum at places A and B is 10 m and 5 m, respectively. The gravity at place A is 10 m/s². Find the gravity at place B, if $T_1 = T_2$	2	4	L4
9	Name any six satellites carrying Synthetic Aperture Radar (SAR) sensor.	2	5	L1
10	What are the key components of a VLBI system?	2	5	L1

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

Q.No.	Questions	Marks	CO	BL
11 (a)	i. Summarize the major advancements in geodesy during the past eight decades.	6	1	L3
	ii. Explain the key techniques used in geodesy for height determination.	7	1	L2
	OR			
11 (b)	i. Review the scope and significance of Selenodesy	6	1	L3
	ii. Describe the key datum parameters used in geodesy and their importance.	7	1	L2

12 (a)	Analyze the effect of Geodetic latitude and azimuth on the computation of the mean radius for Tamil Nadu using the Everest spheroid, if the mean geodetic latitude of the place is 10° 42' 55" N and the azimuth of the line joining Kanyakumari and Chennai is 27°.	13	2	L4
	OR			
12 (b)	Examine the geodetic relationship between points A and B using their coordinates, and compute the distance along with the forward and backward azimuths. ϕ_A = 27° 22' 02.57" N, ϕ_B = 27° 28' 38.31" N, λ_A = 87° 27' 31.86" E, λ_B = 87° 29' 36.08" E	13	2	L4
13 (a)	i. Discuss the various coordinate systems employed to locate celestial bodies, supported by neat sketches. ii. Determine the Hour angle and Declination of the star using the following data: Latitude and longitude of the observer: 13° 00' 40" E and 80° 14' 10" N Azimuth of star = 254° 28' 12", Altitude of star = 20° 19' 48"	8 5	3 3	L1 L3
	OR			
13 (b)	i. Discuss various time systems used in geodesy. Also, discuss the conversion among these systems. ii. Determine the Azimuth and Altitude of the star using the following data: Latitude and longitude of the observer: 13° 00' 40" E and 80° 14' 10" N Hour angle of star = 301° 46' 05", Declination of star = 35° 42' 11"N	8 5	3 3	L1 L3
14 (a)	i. Analyze the components and working principles of satellite gravimetric missions like GRACE and GOCE, and explain how each contributes to measuring Earth's gravity field. ii. Discuss the height systems employed in geodesy? How are they computed?	8 5	4 4	L4 L3
	OR			
14 (b)	i. Compare and Contrast various methods used to determine the geoid. ii. Discuss various methods are employed to measure it relative gravity with their limitations.	8 5	4 4	L4 L3
15 (a)	Analyze the process of interferogram generation in InSAR, recognizing the critical steps that influence the accuracy of surface deformation measurements using InSAR.	13	5	L4
	OR			
15 (b)	Evaluate the efficiency of SAR Interferometry in any two applications with relevant case studies or examples.	13	5	L4

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	Design a geodetic framework for mapping a newly discovered island, outlining how reference points would be established and how azimuths between them would be determined using techniques available in 1990. Justify your choice of methods and explain how they address the challenges of that period.	15	2, 3	L6