CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
IV–B.TECH–II–Semester End Examinations (Advanced Supply) – June - 2025
GLOBAL POSITIONING SYSTEM
(ECE)

[Time: 3 Hours]   **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A   (20 Marks)

1. a) What is the basic concept of satellite navigation? [2M]
   b) What is the role of Time in the GPS system? [2M]
   c) Define pseudorange in the context of GPS. [2M]
   d) How is frequency estimation used in GPS? [2M]
   e) How does antenna design impact GPS signal reception? [2M]
   f) If a GPS receiver is experiencing ionospheric delay of 50 nanoseconds, use the dual-frequency method to estimate and correct this error [2M]
   g) How does geometric analysis improve GPS positioning? [2M]
   h) How do GPS and INS integration architectures enhance navigation performance? [2M]
   i) In a mapping application, GPS data is integrated with GIS. If the GPS data has an error of 3 meters, calculate the potential positional error in a map where a 1 km grid is used [2M]
   j) Explain intelligent transportation systems (ITS). [2M]

PART-B   (50 Marks)

2. Discuss the differences and similarities between the GPS and GLONASS global navigation satellite systems (GNSS) in terms of their satellite constellations, operational frequencies, and global coverage [10M]

OR

3. What is the Operation Segment in GPS? Explain the role of control centers in monitoring and managing the operation of GPS satellites [10M]

4. Describe the process of GPS signal acquisition and tracking. Difference between GPS and Galileo. [10M]

OR

5. What are the anti-spoofing (AS) techniques used in GPS systems? How do these techniques ensure the reliability and security of GPS signals? [10M]

6. Explain the architecture of a GPS receiver. Discuss the key components of a GPS receiver and their functions in determining user position and velocity. [10M]

OR

7. What is multipath error in GPS? Explain the causes of multipath errors and discuss the methods of ionospheric error. [10M]

8. What is Differential GPS? Explain the working principle of WADGPS and LADGPS. [10M]

OR

9. Explain the concept of covariance analysis in GPS and its role in determining the uncertainty of position estimates. How does covariance analysis contribute to the quality of GPS data? [10M]

10. How does GPS contribute to Mapping and Geographic Information Systems (GIS)? [10M]
    Explain the application of GPS.

OR

11. What are the key parameters in GPS observation data and navigation message data? [10M]
    Discuss the RINEX role in GPS.

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