Reg. No. : | | | | | | | | | | | | |

Question Paper Code:U5215

M.E. DEGREE EXAMINATION, NOV 2025

Professional Elective

21PCM515- GLOBAL POSITIONING SYSTEM

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1. (a) Explain in detail about the following: CO1-U (20)

(a) Geometric dilution. (10Marks)

(b) Ionospheric error. (10 Marks)

Or

(b) Explain in detail about any three groups of satellites developed for the GPS program. CO1-U (20)

2. (a) Compare the relationship between frequency noise spectral density and Allan Variance variation with various time interval t for different types of noise and analyze the performance. CO5-Ana (20)

Or

(b) Analyze how the characteristics of the C/A and P signals in Sub frame I of the GPS Clock Correction impact the accuracy of Space Vehicle (SV) position measurements. In your analysis, consider the differences in code clock rates, code periods, and data rates, and discuss their implications on SV clock correction and overall navigation accuracy. CO5-Ana (20)

Parameter	C/A Signal	P signal
Code clock(chip) rate	1.023 Mbps	10.23 Mbps
Code period	1023	$6xa^{12}$;1 week
Data rate	50bps	50bps

3. (a) Discuss about Navigation Pay load requirements. CO1-U (20)

Or

(b) Characterize Time- keeping system (TKS) and the autonomous navigation (AutoNav) capability of Block IIR Space Vehicle Configuration. CO1-U (20)

4.	(a)	Analyze the tracking performance of a Second-Order Noncoherent Delay Lock Loop (DLL) in the presence of an uncorrected GPS satellite Doppler shift of 6 kHz. Additionally, evaluate the noise performance of the Noncoherent DLL under the condition that the normalized maximum code tracking error satisfies $2e+max<0.5T$, where e is the tracking error and T is the chip period. Discuss the implications of these parameters on the stability and accuracy of the tracking loop.	CO5-Ana	(20)
		Or		
	(b)	Analyse and Correlate Interaction of Signal Tracking and Navigation Data Demodulation QPSK and WPSK signal itself can be coherently demodulated by recovering an estimate carrier phase i(t).	CO5-Ana	(20)
5.	(a)	Explain in detail about the functional blocks of GPS receiver.	CO1-U	(20)
		Or		
	(b)	Describe about midphase / inphase bit synchronizer in software signal processing in the receiver side.	CO1-U	(20)