B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Seventh Semester

Electronics and Communication Engineering

20ECEL702 – SMART ANTENNAS FOR MOBILE COMMUNICATION AND GPS

Regulation - 2020

Duration: 3 Hours   Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K-Level	CO
1.	What is MIMO?	1	K1	CO1
	(a) Many input many output (b)Major input minor output			
	(c) Multiple input multiple output (d) Minor input minor output			
2.	Who has the responsibility of billing and system maintenance function in cellular system?	1	K1	CO1
	(a)Base Station (b) PSTN (c) MSC (d) Mobile system			
3.	Which of the following is used to distinguish the selected signal and the multipath signal in smart antenna architecture?	1	K1	CO2
	(a) DSP procedure (b) Switched beam array (c) Range gates (d) Delay Cancellers			
4.	For long distance communication, which of the property is mainly necessary for the antenna?	1	K1	CO2
	(a) High directivity (b) Low directivity (c) Low gain (d) Broad beam width			
5.	What is the full form of UMTS?	1	K1	CO3
	(a) Universal Mobile Telephone System (b) Ubiquitous Mobile Telephone System			
	(c) Ubiquitous Mobile Telemetry System (d) Universal Machine Telemedicine System			
6.	How much packet data rate per user is supported by W-CDMA if the user is stationary?	1	K1	CO3
	(a) 2.048 Kbps (b) 100 Mbps (c) 2.048 Mbps (d) 1 Gbps			
7.	Which among the following indicates the correct set of static GPS surveying technology classification?	1	K1	CO4
	(a) Long and normal base lines (b) Medium and short baselines			
	(c) Long and short baselines (d) Normal and short base lines			
8.	GPS can also be known as _____.	1	K1	CO4
	(a) GOS (b) Arc GIS (c) GIS (d) NavStar			
9.	Which country developed GLONASS in contemporary with the GPS?	1	K1	CO5
	(a) India (b) China (c) Nepal (d) Russia.			
10.	Which of the following is stored in a RINEX observation file?	1	K2	CO6
	(a) Ephemeris data (b) Pseudo range measurements			
	(c) Almanac data (d) Satellite clock errors			

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K-Level	CO
11.	Define spatial processing.	2	K1	CO1
12.	List the types of Smart Antennas.	2	K1	CO1
13.	Mention the limitations of music algorithm.	2	K1	CO2
14.	Give the significance of DOA algorithms.	2	K1	CO2
15.	Define beamforming.	2	K1	CO3
16.	Differentiate Switched beam arrays and Adaptive array antennas.	2	K2	CO3
17.	What is GAGAN?	2	K1	CO4
18.	Compare GPS and GALILEO satellite system.	2	K2	CO4
19.	List the functions of GPS master control station.	2	K1	CO5

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **13898**

20. Write the steps to determine GPS position.	2	K1	CO5
21. Define Geo-Stationary Orbit.	2	K1	CO6
22. Specify the use of Doppler shift measurement in GPS.	2	K1	CO6

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23. a) (i) Briefly explain the key merits of Smart Antennas in wireless communication System.	5	K2	CO1
(ii) Explain SDMA with relevant diagrams.	6	K2	CO1

OR

b) (i) Discuss about Spatial Processing for Wireless Systems.	6	K2	CO1
(ii) Draw and explainsmart antenna systemsarchitecture.	5	K2	CO1

24. a) Explain Mobile communication systems with smart antennas.	11	K2	CO2

OR

b) Discuss the different ways of implementation of Spatial Processing receivers for wireless communication in detail.	11	K2	CO2

25. a) Explain Non-Coherent CDMA Spatial Processors withneat diagrams.	11	K2	CO3

OR

b) Elaborate various Smart antenna Configurations that can be utilized in urban and rural area scenario.	11	K2	CO3

26. a) Show how multipath diversity and spatial diversity are combined in a spatial RAKE.	11	K2	CO4

OR

b) Explain how coherent processors achieve better interference suppression.	11	K2	CO4

27. a) (i) Describe the features of various GNSS systems.	6	K2	CO5
(ii) What are the signal processing techniques used in GPS receiver?	5	K2	CO5

OR

b) Illustrate the GPS system architecture with a diagram and explain how these segments work together to provide positioning services.	11	K2	CO5

28. a) A drone is flying in an urban area with tall buildings causing multipath errors. Analyse how smart antennas and GNSS corrections can improve positioning reliability.	11	K4	CO6

OR

b) Explain how GPS/GNSS can be used in precision agriculture for crop monitoring. Discuss how positional accuracy impacts fertilizer application, irrigation, and harvesting.	11	K4	CO6

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create