

Code No: 128EK

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, July - 2023

SATELLITE COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) Define the azimuth angle. [2]
- b) What are the various forces acting on the satellite in the orbit? Explain. [3]
- c) List out the main types of antennas used on satellite. [2]
- d) What is the relation between saturation flux density and carrier to noise ratio? [3]
- e) What is the function of demand assignment control in DAMA systems? [2]
- f) Write TDMA burst time plan. [3]
- g) Describe the various sources of errors of a GPS signal. [2]
- h) Write short notes on GPS codes. [3]
- i) What are the applications of Tree algorithm? [2]
- j) List the features of pure ALOHA. [3]

PART – B

(50 Marks)

- 2.a) Give a brief history of satellite communications.
- b) Discuss the factors which determine the choice of orbit for a communication satellite. [5+5]

OR

- 3.a) Explain the various frequency band allocations used for satellite services.
- b) Define elevation angle and derive the expression for it. [5+5]

- 4.a) Discuss in detail altitude and orbit control system for a spacecraft.
- b) What are the various subsystems in the satellite? Explain the power system. [5+5]

OR

- 5.a) What is G/T ratio of a satellite link? Derive the expression for it.
- b) Derive the expression for system noise temperature of a satellite link. [5+5]

- 6.a) Write in detail atmospheric and ionospheric effects on satellite link design?
- b) Explain the spread spectrum transmission and reception. [5+5]

OR

- 7.a) How the rain and ice effects the propagation of satellite?
- b) Draw the TDMA frame structure and explain. [5+5]

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- 8.a) Discuss about the primary power test methods used in satellite earth stations.
- b) Explain the trilateration method used for position of GPS receiver. [5+5]

OR

- 9.a) Draw and explain the following with respect to Tracking in range:
 - i) Echo pulse
 - ii) Difference signal between early and late range gates.
- b) Explain about the Differential GPS. [5+5]

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- 10.a) Explain how message is transmitted by FDMA?
- b) Discuss about the satellite packet switches. [5+5]

OR

- 11.a) What is ALOHA system? Describe throughput and discuss the characteristics of slotted ALOHA.
- b) Define Packet and explain in detail about Packet Reservation. [5+5]

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