

R13

Code No: 118EK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, April - 2018

SATELLITE COMMUNICATIONS

(Common to ECE, ETM)

Max. Marks: 75

Time: 3 hours

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 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

(25 Marks)

- 1.a) Define the terms Apogee and perigee. [2]
- b) Discuss atmospheric absorption effects on satellite communications. [3]
- c) Give the uplink Budget of a Satellite with neat diagram. [2]
- d) What are the advantages of GPS system? [3]
- e) What is satellite packet switching? [2]
- f) Explain the Frequency bands allocation for satellite services. [3]
- g) Draw the diagram of TT & C subsystem. [2]
- h) Explain the TDMA frame structure and various components involved in it. [3]
- i) Explain the advantages and disadvantages in positioning satellite in lower orbit. [2]
- j) Describe the Pure ALOHA scheme. [3]

PART - B

(50 Marks)

2. Obtain the orbit equation for an elliptical orbit and prove that the orbital time period T , is given by $T^2 = 4\pi^2 a^3 / \mu$, where a =Semi major axis. [10]

OR

- 3.a) Define the terms
 - i) Ascending and descending nodes
 - ii) Sun-synchronous orbit
 - iii) Angle of inclination.
- b) Define look angles and derive the expressions for the elevation and azimuth angles. [5+5]

4. Write short notes on:

- a) EIRP
- b) Carrier to Noise Density Ratio
- c) Energy bit to noise density ratio
- d) G/T ratio. [10]

OR

- 5.a) Derive the relation between saturation flux density and carrier to noise ratio.
- b) What is Link Budget? Explain Uplink Budget of a Satellite with neat diagram? [5+5]

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6.a) Distinguish the terms multiplexing and multiple Access. Give the calculation procedure of C/N ratio. [5+5]

b) What is Inter modulation in FDMA? [5+5]

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7.a) Explain TDMA frame structure.

b) What are the different types of demand assignment multiple Access characteristics? [5+5]

8. Draw the transmitter and receiver block diagrams of an earth station and explain its Working. [10]

OR

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9.a) Explain about the GPS receivers and its codes. [5+5]

b) Explain about the Differential GPS.

10.a) Define Packet and explain in detail about Packet Reservation. [5+5]

b) Discuss message transmission by TDMA.

OR

11. Write short notes on:

a) Tree Algorithm

b) M/G/I Queue.

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