JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, April - 2018
SATELLITE COMMUNICATIONS
(Common to ECE, ETM)

Time: 3 hours   Max. Marks: 75

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]

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

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

OR

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

9.a) Explain about the GPS receivers and its codes.

   b) Explain about the Differential GPS. [5+5]

10.a) Define Packet and explain in detail about Packet Reservation.

   b) Discuss message transmission by TDMA. [5+5]

OR

11. Write short notes on:

   a) Tree Algorithm.

   b) M/G/1 Queue. [5+5]

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