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06EC662

Sixth Semester B.E. Degree Examination, December 2011

Satellite Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What is satellite communication? List the applications and some of the service provided by satellites. **(06 Marks)**

b. Explain how a satellite continues to be in orbit and derive expressions for :
i) Satellite velocity ii) Orbital period. **(08 Marks)**

c. Define and explain elevation and Azimuth angles of a ground station antenna for communication with an orbiting satellite. **(06 Marks)**

2 a. State Kepler's three laws of planetary motion with the help of appropriate diagrams and give necessary equations. **(08 Marks)**

b. The orbit for an earth orbiting satellite has an electricity of 0.15 and semi major axis of 9000 kms. Determine : i) Periodic time, ii) Apogee height, iii) Perigee height. Given $h = 3.986 \times 10^5$ km^3/s^2. Assume a mean value of 6371 kms for earth's radious. **(06 Marks)**

c. With the help of a neat sketch, explain : **(06 Marks)**
i) Inclination ii) Right ascension of exceeding node iii) Argument of perigee.

3 a. List out the major subsystems required on satellite. **(04 Marks)**

b. Briefly describe the three axes method of satellite stabilization. Define the terms roll, pitch and yaw. **(10 Marks)**

c. State the types of satellite antenna normally used to produce radiation pattern. How spot beams are are produced? **(06 Marks)**

4 a. Derive the satellite link formula. Express the formula in decibels also. **(08 Marks)**

b. A satellite downlink at 12 GHz operates with a transmit power of 6 watts and an antenna gain of 48.2 dB. Calculate EIRP in dBW. **(04 Marks)**

c. Show that the rain attenuation in dB is given by $A_p = \alpha R_p^b L_s r_p$ with usual notations. **(08 Marks)**

PART – B

5 a. With the help of a block diagram, explain the arrangement for Master antenna TV system. **(03 Marks)**

b. Compare CATV and MATV system. **(07 Marks)**

c. With the aid of a block diagram, describe the functioning transmit-receive earth station. **(10 Marks)**

6 a. Explain the concepts of TDMA and FDMA using appropriate figures. Discuss the relative advantage and disadvantage of each. **(10 Marks)**

b. Describe briefly the modes of interference that can occur in a satellite communication system. Distinguish between satellite and terrestrial modes of interference. **(10 Marks)**

7 a. Explain : i) Bit rate for digital TV ii) Radar satellite **(10 Marks)**

b. Explain in detail GPS along with a block diagram of GPS receiver. **(10 Marks)**

8 Write short notes on : a) Pre assigned TDMA b) Home satellite TV
c) Geo stationary orbit d) Irridium **(20 Marks)**

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