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06EC662

Sixth Semester B.E. Degree Examination, May/June 2010
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. Explain briefly the various services provided by a satellite. **(06 Marks)**

b. State Kepler's three laws of planetary motion, with the help of a neat diagram and give necessary equations. **(08 Marks)**

c. Define Keplerian elemental set. **(06 Marks)**

2 a. An earth station is located at latitude 30° S and longitude 65° E. Calculate the antenna look angles for the satellite at 156° E. **(08 Marks)**

b. Briefly explain the launching orbits for a geostationary satellite. **(06 Marks)**

c. A quasi-geo satellite is in a circular equatorial orbit, close to the geosynchronous attitude. Its orbital period is exactly 24 hours, one solar day. Calculate:

i) The radius of the orbit

ii) The rate of drift around the equator of the subsatellite point in degree/solar day. An observer on the earth sees that the satellite is drifting across the sky.

iii) Is the satellite moving towards the east or towards the west? **(06 Marks)**

3 a. For satellite transmission E*l* = 22°, $R_{0.01}$ = 15 mm/h, h_0 = 600 m, h_R = 1500 m. Calculate rain attenuation for vertical polarization at an operating frequency of 14 GHz. (a_v = 0.0335, b_v = 1.128). **(07 Marks)**

b. Explain the different transmission losses in a satellite link. **(07 Marks)**

c. Define saturation flux density. Obtain the equation for saturation EIRP for uplink. **(06 Marks)**

4 a. What is meant by satellite altitude? Briefly describe three axis method of satellite stabilization. **(07 Marks)**

b. With the help of a neat diagram, explain TTC and M subsystem. **(07 Marks)**

c. What is meant by frequency reuse? Briefly describe the working of a wide band receiver. **(06 Marks)**

PART – B

5 a. With a neat block diagram, explain the outdoor and indoor unit for analog FM/TV. **(12 Marks)**

b. Explain the spade system, with a neat diagram. **(08 Marks)**

6 a. With a neat diagram, explain frame and burst formats for a TDMA system. **(07 Marks)**

b. Explain the working of carrier recovery circuit with single tuned circuit having AFC. **(07 Marks)**

c. Determine : i) Miss probability for the values N = 4, E = 5, P = 10^{-3}.

ii) False detection for the values N = 40, E = 5. **(06 Marks)**

7 a. Calculate the bit rate that can be carried in the 36 MHz channel using QPSK, allowing a roll-off factor of 0.2. **(05 Marks)**

b. Explain the very small aperture terminal system. **(08 Marks)**

c. Give the applications of Radar Sat. Explain a 'dawn to dusk' orbit. **(07 Marks)**

8 a. Explain the global positioning system, in detail. **(08 Marks)**

b. Write short notes on : i) System noise temperature ii) Preassigned FDMA. **(12 Marks)**

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