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10EC662

Sixth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Satellite Communication

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. List the services provided by the satellite with frequency band designation. **(08 Marks)**

b. Define the terms : i) Inclination ii) Sub satellite path iii) Perigee iv) Apogee. **(04 Marks)**

c. Determine the limits of visibility for an earth station situated at mean sea level at latitude 54.42°N and longitude 102.20°w. Assume minimum angle of elevation of 5°. **(08 Marks)**

2 a. State and explain with necessary diagram and equations Kepler's three laws of motion. **(10 Marks)**

b. Determine the angle of tilt required for a polarmount used with an earth station at latitude 54°N. Assume spherical earth of mean radius 6371 km and ignore earth station altitude. **(06 Marks)**

c. List Kepler's elemental set. **(04 Marks)**

3 a. Explain Atmospheric and Ionospheric losses in satellite communication. **(06 Marks)**

b. An unlink operates at 14GHz and flux density required to saturate the transponder is $-120B(w/m^2)$. The free space loss is 207dB and other propagation losses amount to 2dB. Calculate the earth station [EIRP] required for saturation, assuming clear sky conditions. Assume [RFL[is negligible. **(06 Marks)**

c. Calculate for a frequency of 12GHz and for horizontal and vertical polarization, the rain attenuation which is exceeded for 0.01 percent of the time in any year, for a point rain rate at 10mm/h, the earth station attitude is 600m and the antenna, elevation angle is 50°, the rain height is 3km and ah > 0.0188, $a_V = 0.0168$, $b_h = 1.217$, $b_V = 1.2$.
Note : All heights and lengths are in KM and rain rate is mm/h. **(08 Marks)**

4 a. Explain momentum wheel stabilization of satellite. **(07 Marks)**

b. Briefly explain TT and C subsystems. **(06 Marks)**

c. Explain satellite transponder. **(07 Marks)**

PART – B

5 a. Explain the DBSTV/FM reception. **(06 Marks)**

b. Describe the community antenna TV system. **(06 Marks)**

c. Explain with figure preassigned FDMA. **(08 Marks)**

6 a. Explain onboard signal processing for FDMA/TDM operation. **(07 Marks)**

b. Briefly explain spade system with chanelising scheme. **(06 Marks)**

c. Explain satellite switched TDMA. **(07 Marks)**

7 Explain the following :

a. Transponder capacity **(07 Marks)**

b. Bit rate digital TV **(07 Marks)**

c. Frequency and polarization. **(06 Marks)**

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

b. Describe the operation of VSAT system and application. **(06 Marks)**

c. Explain Radarsat. **(06 Marks)**

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