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Sixth Semester B.E. Degree Examination, June/July 2016
Satellite Communications

Time: 3 hrs.

Max. Marks:100

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

PART – A

- 1 a. Explain briefly about various satellite communication services. (06 Marks)
- b. State and explain the Kepler's law of planetary motion with neat diagram necessary equations. (10 Marks)
- c. Explain frequency band allocations as per ITU. (04 Marks)
- 2 a. What are the orbit perturbations that take place because of non spherical nature of earth? (10 Marks)
- b. Explain in detail the earth eclipse of satellite and sun transit outage. (06 Marks)
- c. What is side real time? (04 Marks)
- 3 a. Explain what is meant by EIRP? A satellite down link at 12GHz operates with a transmit power of 6W and an antenna gain of 48.2 db calculate the EIRP in dbW. (06 Marks)
- b. Calculate horizontal, vertical and circular polarizations for a frequency of 12GHz. The rain attenuation is exceeded for 0.01% of the time in any year, for a point rain rate of 10mm/hr. The earth station attitude is 600 meters and the antenna elevation angle is 50°. The rain height is 3km and $a_n = 0.0188$ $b_n = 1.217$ $a_v = 0.168$ $b_v = 1.2$. (10 Marks)
- c. List four different transmission losses in a satellite link. (04 Marks)
- 4 a. What is a satellite transponder? With a neat block diagram explain the overall frequency arrangement of typical C band communication satellite. (10 Marks)
- b. What are different types of satellite antennas? Explain briefly all of them. (06 Marks)
- c. What are the major sub systems of a communication satellite? Explain its functions. (04 Marks)

PART – B

- 5 a. What is master antenna TV system? With the help of a diagram describe an arrangement for MATV system. (10 Marks)
- b. With a neat block diagram, Explain outdoor and the indoor unit for analog FM/TV. (10 Marks)
- 6 a. Describe briefly the modes of interference that can occur in satellite communication system. Distinguish between satellite and terrestrial mode of interference. (10 Marks)
- b. The carrier to interference ratio at the ground receiving antenna is 23.3db. For the uplink [C/I] ratio is 27.53db. Find the overall ratio [C/I] ant for $[I/C]_U = 0.001766$ and $[I/C]_D = 0.004436$. (06 Marks)
- c. Explain briefly different types of satellite access? (04 Marks)
- 7 a. Give the applications of Radarsat. Explain a "Dawn to Dusk" orbit. (08 Marks)
- b. Explain frequency and polarization of direct broadcast satellite service. (08 Marks)
- c. Explain bit rates of digital television. (04 Marks)
- 8 a. Calculate the bit rates that can be carried in the 24MHz channels using QPSK, allowing a roll off factor of 0.2. (06 Marks)
- b. Describe the main features iridium system in detail with diagram and application. (10 Marks)
- c. What are the applications of VSAT? (04 Marks)

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