Ex/PG/ETCE/T/127A/2018

MASTER OF ELECTRONICS & TELE-COMMUNICATIO ENGINEERING

EXAMINATION, 2018

1ST Year, 2ND Semester

SATELLITE COMMUNICATION

Time: Three hours Full Marks: 100

Answer any ***four*** questions.

All questions carry equal marks

1. a) Discuss with block diagram the typical architecture of a satellite earth station.

   b) Specify the different losses in satellite communication system.

   b) Determine the power received by a satellite located at **40000** km from the surface of the earth. Satellite is operating at a frequency of **11** GHz and has effective isotropic radiated power (EIRP) of **21** dBW. The gain of a receiving antenna is **50.5** dB.

   c) For a 4 GHz receiver. The following parameters of gains and noise temperature are given as T_{IN} = 50 K, T_{RF} = 50 K, T_M = 500 K, T_{IF} = 1000 K, G_{RF} = 23 dB, G_M = 0 dB, G_{IF} = 30 dB. Calculate the system noise temperature.

   d) A receiving system has antenna noise temperature 60° K and receiver noise Figure 9 dB. Calculate the system noise temperature.

   5+5+6+5+4

2. a) Mention the special characteristics of modern satellite antenna.

   b) With a schematic diagram discuss the construction and working principle of Cassegrain antenna used in satellite earth station.

   c) Give the simplified block diagram of single conversion transponder for 6/4 GHz and explain the function of each block.

   6+ (4+8) +7

3. a) Explain briefly the operation of high power amplifiers used in satellite.

   b) What are the requirements of redundancy configuration in each subsystem of satellite earth station?

   c) Discuss with a schematic diagrams of redundancy configurations used in satellite.

   8+5+12

4. a) Explain as to how satellite eclipse effect the working of a communication satellite. How the communication is maintained during satellite eclipse?

   b) How station keeping is implemented in a satellite system?

   c) State briefly the power generation and altitude stabilization in a satellite system.

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(4+3)+5+13

5. a) What are the overheads in TDMA frame?

   b) Sate the salient features how TDMA frame efficiency can be improved.

   c) Explain the Pulse Stuffing.

   d. Discuss the functioning of the burst and unique word.

3+5+5+12

6. a) What is the difference between FDM and FDMA.

   b) With a suitable example show how FDM is achieved.

   c) For a FDM-FM-FDMA system calculate the carrier to noise ratio **(C/N)** of the signal in terms of S, N, b, B, f_m, f_r. The terms used has their respective meaning.

5+5+15

7. a) With neat block diagram explain the working of a SPADE (SCPC-DAMA) system.

   b) Discuss briefly the working of a transmit synthesizer used in SPADE system.

   c) Draw a schematic block diagram of multichannel transponder.

10+6+9