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Total Number of Pages: 02

B.Tech
PEEC5418

8th Semester Regular / Back Examination 2017-18
SATELITE COMMUNICATION SYSTEMS

BRANCH: AEIE, CSE, ECE, EEE, EIE, ELECTRICAL, ETC, IEE, IT, ITE, MINING

Time: 3 Hours

Max Marks: 70

Q.CODE:C395

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

- Q1 Answer the following questions: (2 x 10)**
- a) What is GEO satellite? (2)
 - b) What do you understand from perigee and apogee of the satellite orbit. (2)
 - c) Explain Kepler's three law of Planetary Motion. (2)
 - d) What do you mean by eccentric anomaly and mean anomaly? (2)
 - e) The receiver-transmitter units are called as _____.
 - f) Why equatorial launch of satellite is preferred over any other type of launch? (2)
 - g) The earth rotates once per side real day of 23h 56m 4.09s. Find the radius of the GEO satellite. (2)
 - h) Which of the following parameters are needed to find the look angles for GEO satellite? (2)
 - a. Earth station latitude
 - b. Earth station longitude
 - c. Satellite range
 - d. Sub-satellite longitude
 - i) Explain Carson's Rule of bandwidth of FM signals. (2)
 - j) Why pre-emphasis and de-emphasis are used in FM transmission. (2)
- Q2**
- a) Explain various applications of LEO and MEO satellite. (5)
 - b) A satellite is in an elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Considering the mean earth radius of 6378.14 km. (5)
 - 1. Calculate the period of orbit in hours, min, and seconds (2)
 - 2. Find the eccentricity of the orbit. (2)
- Q3**
- a) Enlist various types of launch vehicles. Why these launch vehicles are required for satellites? (5)
 - b) Calculate the gain of a paraboloidal antenna with diameter of 2.14m operating at a frequency of 11.45GHZ. Assume an aperture efficiency of 68%. (5)
- Q4**
- a) Explain TTC&M System with neat block diagram. (5)
 - b) Explain personal communication system using LEO satellites. (5)

Q5 a) What do you mean by G/T ratio in satellite communication system? **(5)**

Discuss its importance in an earth station.

b) Briefly discusses various types of antenna used in satellites. **(5)**

Q6 a) Describe the complete uplink and downlink system design for C band satellite communication system considering any suitable case. **(5)**

b) Any earth station is located at 60° E, 30° N. Determine the look angles and range of geostationary satellite at 90° E. **(5)**

Q7 A C-band earth station has an antenna with a transmit gain of 54dB. The transmitter output power is set to 100W at a frequency of 6.1 GHz. The signal is received by a satellite at a distance of 37,500 km by an antenna with a gain of 26 dB. The signal is then routed to a transponder with a noise temperature of 500K, a bandwidth of 36 MHz and a gain of 110 dB. **(10)**

The signal is received by a satellite at a distance of 37,500 km by an antenna with a gain of 26 dB. The signal is then routed to a transponder with a noise temperature of 500K, a bandwidth of 36 MHz and a gain of 110 dB.

1. Find the path loss at 6.1 GHz
2. Find the power at the output port of satellite antenna in dBW.
3. Calculate the noise power at transponder input in dBW in a bandwidth of 36 MHz.
4. Find the C/N ratio in dB in the transponder.

Q8 Write short answer on any TWO: (5 x 2)

a) DBS-TV

b) Sun Transit Outage

c) AOCS

d) TDMA