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(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 121854 Roll No. | | | | | | | | | |

B.TECH.

Theory Examination (Semester-VIII) 2015-16

SATELLITE COMMUNICATION

Time : 3 Hours *Max. Marks : 100*

Section-A

Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)

(a) Discuss the methods to achieve station keeping of satellite.

(b) What do you understand by argument of perigee?

(c) Write uplink and downlink frequencies of satellite communcation. Explain the reason why these frequencies are different?

(d) Explain Kepler's laws of planetary rotation.

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(e) Describe the function of a satellite transponder.

(f) What do you mean by carrier to noise ratio? Describe its significance for satellite link design?

(g) Explain the ice effect in satellite communication.

(h) Enlist the applications of medium-gain directional mobile satellite antennas.

(i) Describe the utilization of pre-emphasis and de-emphasis.

(j) Write the name of codes for error control for digital satellite links.

Section-B

Q2. Attempt any five questions from this section. **(10×5=50)**

(a) Write the advantages and disadvantages of Geostationary orbit. A satellite moving in a highly eccentric Molniya orbit having the farthest and the closest poins as 35000km and 500km respectively from the surface of the earth. Determine the orbital time period and the velocity at the apogee and perigee points.

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(b) Explain rain attenuation and rain depolarization in detail with suitable diagrams.

(c) State and explain the different segments of GPS. What is meant by satellite signal acquisition in GPS?

(d) Discuss the various types of antenna used for mobile satellite broadcasting. What are their technical requirements?

(e) With the help of a suitable block diagram, explain the working of DBS Television network in detail.

(f) Derive the general link equation. Find out the expression for C/N and G/T ratio.

(g) What do you understand by system noise temperature? Derive its relation for equivalent system noise temperature.

(h) With the help of a suitable diagram, explain satellite communcation system architecture using VSAT. Also write the Applications of VSAT.

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Note: Attempt any two questions from this section.

(15×2=30)

Q3. (a) What are the factors that affect the uplink design and the downlink design in geostationary satellites?

(b) What is meant by look angles? Explain them with reference to a geostationary satellite and the earth station.

Q4. (a) Write short note on satellite signal acquisition.

(b) The EIRP of a 240 W transponder is 57 dB W. Calculate the approximate gain of the antenna if the transponder is switched to 120 W. Also calculate the new EIRP assuming that the same antenna is used.

Q5. (a) Three amplifiers are connected in cascade having a gain of 20 dB each. If the noise temperature is 100K, determine the overall gain.

(b) Write short note on Wire Quadrifilar Helix Antenna (WQHA) for hand held terminals.

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