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BT-7/ M-19

SATELLITE COMMUNICATION

Paper–ECE-423N

Time allowed : 3 hours] *[Maximum marks : 75*

Note : *Attempt any five questions, selecting at least one question from each unit.*

Unit–1

1. (i) The orbit of an earth orbiting satellite has an eccentricity of 0.15 and semi major axis of 9000Kms. Determine : (a) Periodic time (b) Apogee height (c) Perigee height. Given $h = 3.986 \times 10^5$ Km^3/s^2. Assume a mean value of 6371 Kms for earth's radius. 7.5

(ii) With the help of neat diagram explain Keplerian orbital elements. 7.5

2. Explain any *three* of the following : 15

(i) Doppler shift

(ii) Sun transit outage

(iii) Launch and launch vehicles-ELV's

(iv) Geostationary orbit

Unit–2

3. (i) What is a satellite Transponder ? With the help of diagram explain the overall frequency arrangement of a typical C-band communication satellite. 7.5

(ii) Write a short note on Altitude and Orbit control. 7.5

4. (i) State the types of satellite antenna normally used to produce radiation pattern. How spot beams are produced ? 7.5

(ii) List out major subsystems required on satellite. 7.5

Unit–3

5. (i) Write a short note on downlink design-link budget used in satellite link design. 7.5

(ii) Why an uplink frequency is higher than the downlink frequency ? Justify your answer. 7.5

6. (i) Show that rain attenuation in dB is given by $Ap = \alpha R_p^b L_s r_p$ with usual notations. 7.5

(ii) Discuss and Explain the relation between system noise temperature and G/T ratio. 7.5

Unit–4

7. How CDMA is better than FDMA and TDMA ? Discuss its principle of working with suitable diagrams. Also compare CDMA with DAMA multiple access technique. 15

8. What is meant by DBS service ? With the help of block diagram, explain home terminal for DBS TV/FM reception. 15

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