Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 30922

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Eighth Semester

Electronics and Communication Engineering

EC 2045 — SATELLITE COMMUNICATION

(Regulation 2008)

(Common to PTEC 2045 – Satellite Communication for B.E. (Part-Time) Seventh Semester – Electronics and Communication Engineering – Regulation 2009)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Given the geostationary orbital radius 'r', the Earth's radius 'R' and speed of light 'C' how will you compute the time taken for a signal to pass from Earth to the Satellite and back again?

2. Enlist the traditional orbital Keplerian elements.

3. What is the need for thermal control and propulsion?

4. Mention about the functions of AOCs.

5. A 10-KHz tone is used to frequency modulate a carrier, the peak deviation being 75 KHz. Use Carson's rule and estimate the bandwidth required.

6. Give the reasons for implementing FDMA/TDM in satellite links.

7. For a given satellite and, signal transmission, what are the earth station parameters affecting the C/N ratio?

8. Why is the cassegrain antenna popular for large earth stations?

9. List out the popular 'INTELSAT' – series.

10. Mention the application of INMARSAT systems.

PART B — (5 × 16 = 80 marks)

11. (a) What are look angles? Explain how look angles are determined using sub-satellite points? Derive the necessary expressions for look angles.

Or

(b) Give a detailed note on launching vehicles and the procedures employed for launching spacecraft in GEO orbits.

12. (a) From the calculation of system noise temperature prove that C/N ratio is directly proportional to G/T ratio.

Or

(b) (i) List and explain the factors governing the design of satellite links. (10)

(ii) What are the factors contributing to noise in an earth station receiving channel? (6)

13. (a) (i) Explain the need for a reference burst and preamble in a TDMA system. Describe and compare the channels carried in a preamble with those carried in a reference burst. (12)

(ii) Explain initial acquisition, burst synchronization, frame efficiency in relation to TDMA operation. For a TDMA network, calculate the frame efficiency given the following information. (4)

Total Frame length = 120,832 symbols

Traffic bursts per frame = 14

Reference bursts per frame = 2

Guard interval = 103 symbols.

Or

(b) Explain the principle behind spectrum spreading and despreading. How are these techniques used to minimize interference in CDMA systems? Also determine its throughput.

14. (a) Write short notes on the following :

(i) TVRO (5)

(ii) MATV (5)

(iii) CATV. (6)

Or

(b) With neat block diagrams explain the transmitter, receiver and antenna systems involved in Earth station.

15. (a) Enumerate how GSM and GPS deploying Satellites have improved the mobility of the customers.

Or

(b) Write short notes on the specialized services offered by satellites for video conferencing e-mail and internet.

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