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**Question Paper Code : 73426**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Eighth Semester

Electronics and Communication Engineering

EC 2045/EC 810/10144 ECE 52 – SATELLITE COMMUNICATION

(Regulations 2008/2010)

(Common to PTEC 2045 – Satellite Communication for B.E. (Part-Time) Seventh Semester – ECE – Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Kepler's 2<sup>nd</sup> law of planetary motion.
2. State the condition for visibility of satellite to an observer standing on earth surface.
3. How does intermodulation noise originate in a satellite link?
4. What is meant by antenna noise temperature and system noise temperature referred to the input?
5. Define multiplexing.
6. Write the two basic problems in satellite digital transmission.
7. What is terrestrial interface?
8. An antenna has a noise temperature of 35 K and it is matched into a receiver which has a noise temperature of 100 K. Calculate the noise power density and the noise power for a BW of 36 MHz.
9. When the available bandwidth is 500 MHz, how many transponder each of bandwidth 24 MHz can be accommodated.
10. What is meant by congestion and slowstart with reference to Internet traffic?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Determine the look angles and the range for a geostationary satellite at 30 degrees for an ES at latitude -20 degrees. The ES is situated 1000 m above mean sea level. (6)
- (ii) State Kepler's laws as applied to satellite communication. Briefly describe the orbital parameters with the help of a diagram. (10)

Or

- (b) (i) Briefly discuss about the eclipse effect and other outages that affect the working of a geo satellite. (8)
- (ii) Determine the limits of visibility for an ES situated at mean sea level at latitude 48.42 degrees north and longitude 89.26 degrees west. (8)
12. (a) How do the TT and C subsystem perform aboard the spacecraft? Also explain the working of a transponder unit. (16)

Or

- (b) How is the performance of a satellite impaired due to external factors? Also suggest suitable methods to overcome the same. (16)
13. (a) (i) Explain about the implementation of TDMA and its Frame structure in detail. (10)
- (ii) How the schemes for compression and encryption are implemented for satellite technology? (6)

Or

- (b) (i) Explain the principle behind spectrum spreading and despreading and how this is used to minimize interference in a CDMA system. (8)
- (ii) Discuss about the digital modulation schemes adopted for satellite links. (8)
14. (a) With neat diagrams, explain the procedure for measuring critical satellite parameters like  $C/N_0$  and  $G/T$ . Emphasise on the significance of these parameters. (16)

Or

- (b) In detail, explain the block diagram representation of a typical digital earth station (Transmitter and Receiver). Give the block diagrams. (16)

15. (a) Explain the types of INTELSAT satellites with respect to basic space craft characteristics and vehicle type. (16)

Or

- (b) (i) Explain the block diagram of an outdoor unit for a DBS home receiver. (8)
- (ii) With a block schematic explain about DTH system. (8)
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