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# Question Paper Code: 1068120

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV/ DEC 2024
Eight Semester
Electronics and Communication Engineering
EC8094 - SATELLITE COMMUNICATION
(Regulation 2017)

Time: Three Hours Maximum: 100 Marks

Answer ALL questions

PART – A (10 x 2 = 20 Marks)

1. Identify the type of orbit where a satellite appears stationary relative to the Earth's surface.

2. Recall Kepler's Law.

3. List the key functions of a satellite's communication payload.

4. Outline the importance of thermal control systems in maintaining spacecraft performance.

5. Identify the factors affecting rain-induced attenuation in satellite links.

6. Infer how the frequency reuse improves satellite link capacity.

7. Tell two multiple access techniques used in satellite communication.

8. Outline the significance of encryption in satellite communication.

9. What are the key features of the INTELSAT satellite series?

10. Show the main differences between LEO and MEO satellites in terms of latency and coverage.

PART – B (5 x 13 = 65 Marks)

11. (a) (i) Compare geostationary and non-geostationary satellites based on their orbital mechanics. (7)
(ii) Analyze the importance of accurate look angles in satellite tracking. (6)

(OR)

(b) (i) Analyze how sun transit outages impact satellite communication links. (7)
(ii) Discuss the limitations and advantages of using geostationary satellites for broadcasting. (6)

12. (a) (i) Examine the process of orbit correction using propulsion systems. (7)
(ii) Analyze the effect of propulsion failures on the satellite's operational life. (6)

(OR)

(b) Explain in detail about the satellite transponders and antenna subsystems. (13)

13. (a) (i) Assess the significance of rain attenuation in Ku-band and Ka-band communication. (7)
(ii) Compare the effects of ionospheric disturbances on low-frequency and high-frequency satellite signals. (6)

(OR)

(b) Explain in detail about link design and compare the link design with and without the frequency reuse in satellite. (13)

14. (a) (i) Analyze the impact of digital video broadcast (DVB) on satellite communication for multimedia transmission. (7)
(ii) Model a satellite system to transmit both analog and digital signals, considering modulation techniques. (6)

(OR)

(b) With a neat diagram explain the working principle of simple TDMA-based satellite access system. Also compare the TDMA and FDMA in terms of efficiency and bandwidth utilization. (13)

15. (a) (i) Analyze the working principles of GPS and the factors affecting its accuracy. (7)
(ii) Compare INSAT and INTELSAT in terms of their primary functions and applications. (6)

(OR)

(b) (i) Analyze the working of Direct Broadcast Satellite (DBS/DTH) systems for television broadcasting. (7)
(ii) Compare LEO, MEO, and GEO satellites based on their applications, coverage, and delay. (6)

## PART – C (1x15 = 15 Marks)

16.(a) (i) Analyze the role of Attitude and Orbit Control Systems (AOCS) in maintaining satellite stability. (8)
(ii) Compare the functionality and design challenges of primary power systems in Low Earth Orbit (LEO) satellites versus Geostationary Orbit (GEO) satellites. (7)

(OR)

(b) (i) Evaluate the impact of telemetry, tracking, and command (TT&C) subsystems on satellite mission success. (8)
(ii) Analyze the interdependence between the communication payload and support subsystems in a satellite. (7)

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