

Con. 4454-12.(REVISED COURSE)
(3 Hours)

[Total Marks : 100

GN-8276

- N.B. :** (1) Question No. 1 is compulsory.
(2) Attempt in all five questions.
(3) Assume suitable data if necessary.

1. Answer the following (any four) :- 20
- What are the advantages of satellite communication over terrestrial communication ?
 - Why uplink frequency is different from downlink frequency ? Explain.
 - Explain Kepler's laws.
 - Explain reliability and space qualification.
 - Compare FDMA and CDMA.
2. (a) Explain the following terms with reference to satellite communication :- 10
- Apogee, Perigee
 - Ascending node, descending node
 - Argument of perigee
 - Right ascension of ascending node
 - Mean anomaly, Eccentric anomaly.
- (b) A satellite orbit has an eccentricity of 0.15 and a semi major axis of 9000 Km. 10
Find the :-
- Periodic time
 - Latus rectum
 - Minor axis
 - Apogee height
 - Perigee height
- [Assume $\mu = 3.986 \times 10^{14} \text{ m}^3/\text{sec}^2$, $r_e = 6378 \text{ Km}$].
3. (a) Explain the various stages in launching of a geostationary satellite into Final circular orbit with zero inclination by ELV. 12
- (b) With the help of a block diagram explain TT&C system. 8
4. (a) A communication satellite is located in a geostationary orbit at a longitude of 30° west. Determine the slant range, Azimuth and elevation angles of the satellite as seen from a ground station at a longitude of 74°W and latitude of 41°N. 10
[Assume $r_e = 6378 \text{ Km}$].
- (b) What is satellite stabilization ? Explain three axis stabilization method. 10
5. (a) Explain SPADE system of FDMA. 10
- (b) A receiver for geostationary satellite transmission at 2.2GHz has an equivalent noise temperature of 160 K and a bandwidth of 1MHz. The receiver antenna has a gain of 30db and the antenna noise temperature is 190db. What is the minimum required satellite transmitter power to achieve a 20db CNR at the output of the receiver. 10

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6. (a) What is polarization of satellite signals ? Explain. 10
(b) Explain the following :- 10
 (i) Sun transit outage
 (ii) Minimum inclination at launch of a satellite
 (iii) Combined C/N of a satellite.
7. Write note on any three :- 20
 (a) Orbital perturbation
 (b) Double conversion Transponder
 (c) TDMA frame structure
 (d) Earth eclipse of satellite.
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