

Code: D-17

Subject: ELEMENTS OF SATELLITE COMMUNICATION

December 2005

Time: 3 Hours

Max. Marks: 100

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q. 1. must be written in the space provided for it in the answer book supplied and nowhere else.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or best alternative in the following: (2x10)

- a. The place where a line drawn from the centre of the earth to the satellite passing through earth's surface is called as _____
- (A) subsatellite point. (B) longitude point.
(C) latitude point. (D) All of the above.
- b. The system which collects data from sensors of the space craft and sends to the controlling earth station is called _____
- (A) Tracking system (B) AOCS system
(C) Telemetry system (D) Power system
- c. The sun radiation falling on a spacecraft at geostationary altitude is _____
- (A) $1.39\text{KW}/\text{m}^2$. (B) $4.9\text{KW}/\text{m}^2$.
(C) $6\text{KW}/\text{m}^2$. (D) $10\text{KW}/\text{m}^2$.
- d. Which multiple access technique is more suited to commercial satellite system.
- (A) TDMA. (B) CDMA.
(C) FDMA. (D) TDMA & FTDMA.
- e. _____ injects satellites from transfer orbit into Geostationary orbit.
- (A) Apogee kick motor (B) Perigee kick motor
(C) STS (D) ELV
- f. Most preferred modulation method in satellite communication is

- (A) Frequency shift keying (B) QAM
(C) DPSK (D) BPSK

g. Figure of merit of Earth station is given by the ratio

- (A) C/N . (B) P_r/P_T .
(C) G_r/T_s . (D) S/N .

h. Large earth station preferred antenna

- (A) Front fed. (B) Parabolic.
(C) Cassegrain. (D) Spherical reflector.

i. The farthest distance that a satellite orbit reaches from the earth surface is called

- (A) Apogee. (B) Perigee.
(C) Prograde. (D) Retrograde.

j. The geographical presentation of a satellite antenna radiation pattern is called

- (A) EIRP. (B) Foot print.
(C) Look angle. (D) SSP.

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain in detail about the ground segment of a satellite. **(10)**

b. Write a note on Earth Station Antennas. **(6)**

Q.3 Write short notes on
(i) TDMA Technique.
(ii) QPSK Modulation and Demodulation Techniques. **(16)**

Q.4 How many subsystems are there in a spacecraft? Explain them in detail. **(16)**

Q.5 a. Explain in detail why 6/4 GHz communication is used in satellite communication systems?
(10)

b. Explain the importance of G/T ratio in satellite link design. **(6)**

- Q.6** a. Explain briefly Satellite stabilization & various techniques used for it. **(7)**
- b. Write briefly on
- (i) Various applications of satellites.
 - (ii) INMARSAT **(6+3)**
- Q.7** a. List the various advantages and disadvantages of satellite communications? **(8)**
- b. Explain why for covering the entire globe continuously only 3 communications satellites are sufficient? **(8)**
- Q.8** a. What are the orbital parameters required to determine a satellite's orbit? Name and explain them. **(8)**
- b. What is the eclipse effects on the satellites? Explain. **(8)**
- Q.9** Write short notes on
- (i) Attitude control.
 - (ii) Frequency reuse.
 - (iii) DAMA.
 - (iv) SCPC system. **(16)**