

Duration: 3hrs

[Max Marks:80]

N.B. : (1) Question No 1 is Compulsory.

(2) Attempt any three questions out of the remaining five.

(3) All questions carry equal marks.

(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any **FOUR** **[20]**
 - a Explain polarization **[5]**
 - b Explain the various frequency bands used in satellite communication. List out advantages and disadvantages of 6/4 GHz band used in satellite communication **[5]**
 - c Compare DS- CDMA & FH-CDMA **[5]**
 - d Explain the parameters that control the design of earth station **[5]**
 - e Write a short note on bath tub curve. **[5]**
- 2 a Draw and explain simplified block diagram of satellite transponders: **[10]**
 - a. Single conversion C band. b. Double conversion Ku band
- b Define the following with respect to TWTA amplifier **[10]**
 - a. 1 dB compression point
 - b. Input and Output back-off
 - c. 3rd order Inter-modulation Noise
 - d. Am/PM conversion coefficient
- 3 a A multiple carrier satellite circuit operates in the 6/4-GHz band with the following characteristics. Uplink: Saturation flux density -67.5 dBW/m^2 ; input BO 11 dB; satellite G/T -11.6 dBK . Downlink: Satellite saturation EIRP 26.6 dBW ; output BO 6 dB; free-space loss 196.7 dB ; earth station G/T 40.7 dBK . For this example, the other losses may be ignored. Calculate the carrier-to-noise density ratios for both links and the combined value **[10]**
- b Explain **[10]**
 - (1) Lobe switching
 - (2) Mono pulse tracking

(3) step tracking

(4) intelligent tracking

- 4 a Explain TDMA frame structure and Unique word detection in detail. **[10]**
b Draw a block diagram of TVRO or DBS system and explain each block in brief **[10]**
- 5 a Write a short note on **[10]**
a. Sun-synchronous orbit.
b. Polar orbit
c. Molynia orbit
d. Sun transit outage
e. Solar and Sidereal day
b Derive general link equation. Find expression for C/N and G/T ratio. Explain **[10]**
importance of these ratios in satellite link design.
- 6 a Differentiate MCPC and SCPC FDMA systems and explain SPADE system in **[10]**
detail,
b What are the different types of lasers used for satellite communication? Explain **[10]**
acquisition link model for optical communication
