Printed pages: 01 **Sub Code: MTEC042**

Paper Id | 2 | 3 | 1 | 2 | 0 | 5 | **Roll No.** | | | | | | | | | | |

M. TECH

THEORY EXAMINATION 2018-19 (SEM-II)

ADVANCED SATELLITE COMMUNICATION

Time: 3 Hours ***Total Marks: 70***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a. What are the parameters which may affects the orbital position of satellite.
b. What is network synchronization?
c. What do you mean by noise figure?
d. What do you mean by system noise temperature?
e. What do you mean by an equipment relaibilty.
f. Explain the factors which affect the channel capacity.
g. What do you mean by EIRP?

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

(a) With the help of a simple block diagram, explain the function & working of a satellite transponder.
(b) Explain how intermodulation noise originates in a satellite link, and describe how it may be reduced. In a satellite circuit the carrier-to-noise ratios are uplink-25 dB; intermodulation 13 dB. Calculate the overall carrier-to noise ratio.
(c) Explain TDMA in detail with block diagram. Also write its advantage & disadvantage.
(d)What is look angle? Explain in detail azimuthal angle & elevation angle.
(e) Explain RADARSAT in detail with the help of block diagram.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a) A satellite moving in a highly eccentric Molniya orbit having the farthest and the closest points as 35000 km and 500 km respectively from the surface of the earth. Determine the orbital time period and the velocity at the apogee and perigee points.
(b) List the orbital elements of a satellite and briefly explain them.

4. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain the working of a Global Positioning System (GPS) receiver. Explain why a minimum of four satellites must be visible at an earth location utilizing the GPS system for position determination.
(b) The following parameters apply to a satellite downlink : saturation [EIRP] 22.5 dbW ,free-space loss 195 dB, other losses are 1.5 dB, earth station G/T is 37.5 dB/K. Calculate the carrier-to-noise density (C/N_o) at the earth station. Assuming an output back-off of 6 dB is applied, what is the new value of (C/N_o) ratio?

5. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain Kepler's laws of planetary rotation. How are these applied to the case of geostationary satellite?
(b) Explain what you mean by geostationary orbit. How do the geostationary orbit & geosynchronous orbit differ?

6. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain FDM. Also calculate the Overall Carrier to Noise Ratio on a FDM/FM/FDMA Link.
(b) Briefly describe the types of antennas used for mobile satellite broadcasting. What are their technical requirements?

7. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain the working of Direct Broadcast Satellite (DBS) television network.
(b) Describe the operation of a typical VSAT system. State briefly where VSAT systems have widest application.