No. of Printed Pages : 04 **Roll No. .....**

W-5101

M. Tech. (W)

EXAMINATION, Dec. 2017

(First Semester)

(Part Time) (Re-appear)

(ECE)

MECW-501

SATELLITE AND SPACE COMMUNICATION

Time : 3 *Hours*] [*Maximum Marks :* 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *Five* questions. All questions carry equal marks.

7. Briefly explain the block diagram of deep space optical communication link. Also explain, how Optical Statellite Communication is different from R.F Satellite Communication. **20**

8. Explain any *two* of the following : **20**

(i) VSAT

(ii) MSAT

(iii) GPS

(iv) SPADE System.

1. Briefly explain the block diagram of earth station, used in satellite communication. Also explain why uplink frequency used in satellite communication is more as compared to downlink frequency. **20**

2. (a) How active satellite are different from passive satellites ? Explain. **10**

(b) Explain system noise temperature and prove that : **10**

$$T_S = T_{in} + T_{RF} + \frac{T_m}{G_{RF}} + \frac{T_{IF}}{G_m G_{RF}}$$

3. Assume that an earth station situated in DCRUST Murthal needs to calculate the look angle to a Geostationary satellite in the Indian Ocean operated by Intelsat. The given parameters are : earth station latitude and longitude 52º N and Oº, Satellite longitude 66º E, Find the central angle, elevation angle, intermediate angle and Azimuth angle. **20**

4. (a) What are the differences between $\frac{C}{N}$ and $\frac{G}{T}$ ratio ? Prove that :

$$\frac{C}{N} = \frac{1}{K \cdot B}.EIRP.(L_F)^2\left(\frac{G}{T}\right)$$

where K is Bolzman constant and L_F is free space loss. **12**

(b) Explain the earth coverage strategy of Geostationary Satellites. **8**

5. Sketch and explain the block diagram of tracking, telemetry, command and monitoring system used in Satellite Communication. **20**

6. (a) What do you mean by bit error rate ? Explain, how BER is different for BPSK and QPSK. **10**

(b) What is burst time plan ? Explain its structure and importance. **10**