Roll No. ..... **Total Pages : 03**

BT-7/M-20 **37139**

SATELLITE COMMUNICATION
ECE-423N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. State Kepler's three laws of planetary motion. Explain their relevance to artificial satellites orbiting the earth. **15**

2. The cosmos 1675 satellite has an apogee height of 39342 Km and a Perigee height of 613 Km. Determine the semi-major axis and the eccentricity of its orbit. Assume a mean earth radius of 6371 Km. What are the effects of a non-spherical earth on the oribital mechanics of a satellite ? **15**

Unit II

3. (a) List the different kinds of losses and attenuation caused due to antenna. **7½**

(b) For a 24 MHz bandwidth transponder and allowing for a roll off factor of 0.2, what is symbol rate ? The EIRP of a 240 W transponder is 57 dBW. Calculate the approximate gain of the antenna. Suppose if this transponder is switched to 120 W, what will be the new EIRP, given the same antenna is used ? **7½**

4. (a) Write a short note on Transponders. **7½**

(b) What are Napier's rules ? **7½**

Unit III

5. Derive the relation between system noise temperature and G/T ratio. Also, discuss the major attributes related to this derivation. **15**

6. (a) Why is an uplink frequency higher than the downlink frequency ? Justify your answer. **7½**

(b) Write a note on communication link design procedure. **7½**

Unit IV

7. (a) Briefly discuss VSAT earth station engineering. **7½**

(b) Discuss C band and Ku band home TV systems. **7½**

8. Write short notes on any *three* of the following : **15**

(a) Digital DBS

(b) Global positioning system

(c) Satellite mobile systems

(d) DAMA.

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