

Total number of printed pages-4

53 (EC 814) STCM

2018

SATELLITE COMMUNICATION

Paper : EC 814

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer **any five** questions out of **seven**.

1. (a) Name the first artificial Satellite launched by the USSR in October 1957. Also point out its drawback for not using it too much in Satellite communication. 1+6=7

- (b) Explain why repeater is used in satellite for the study of satellite communication. 7

- (c) Name the first Intelsat Satellite that was launched on April 16, 1965. Also explain it. 1+5=6

Contd.

2. (a) Describe why Orbital Mechanics is required for the study of Satellite Communication. 5
- (b) By using *two* different types of forces on the satellite find out the equation for the velocity of a satellite in a circular orbit. 15
3. (a) Explain how *six* different orbital elements are needed for the orbital determination of a satellite. 6
- (b) Define Doppler shift of orbital effects in communication systems performance. 6
- (c) Explain the *two* transponders used in communication subsystem with proper figure. 8
4. (a) Explain in details about Telemetry, Tracking, Command and Monitoring (TTC&M) subsystem with its proper figure. 15

- (b) Point out the main differences between Horn Antenna and Reflector Antenna in antenna subsystem. Also describe why subsystems are required for the Satellite Communication System. 3+2=5
5. (a) What are the *three* different prototype models which are required for space qualification of a satellite in a Satellite Communication System ? 7
- (b) Explain how uplink design is easier than downlink design of a Satellite Communication System. 4
- (c) Explain basic transmission theory of Satellite Communication System. 9
6. (a) Explain communication subsystem. Also explain the function of transponder present in it. 7+3=10
- (b) Explain why Nadir and Zenith direction are required for an observer for the study of sub-satellite point in a Satellite Communication System. 8

(c) Why is it necessary for a satellite having two different forces on it when revolving in a circular orbit around a planet ?

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7. (a) Explain orbit considerations of a Satellite Communication. Also point out the main differences between Equatorial Orbits, Inclined Orbits and Molniya Orbit.

4+8=12

(b) Explain Voice Signal Multiplexing in details along with its proper diagram.

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