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## CS/M.Tech (ECE)/SEM-2/MCE-205 A/2013 2013

## SATELLITE COMMUNICATION

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Question No. 1 is compulsory and attempts any 4 from the rest.

- 1. a) Define the following parameters with reference to satellite orbits:
  - a) apogee b) perigee c) eccentricity 3
  - b) What are the essential features of a low noise amplifier?

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- c) What are the essential criteria for designing an Uplink for Satellite system?
- d) What are the disadvantages of VSAT?
- e) If e is the eccentricity and a the semi major axis of elliptical orbit, determine apogee & perigee distances if e is 0.6 and ae = 18000 km.

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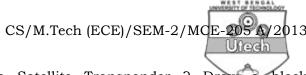
## CS/M.Tech (ECE)/SEM-2/MCE-205 A/2013

2. a) Give a one line definition of Satellite? What is a Keplerian Orbit? What is sub satellite point? 1 + 1 +	a 1
b) What are the 3 laws of Kepler that govern the movemen	.t
of planets around earth?	6
c) Explain the concept of "Look Angle" with reference to	0
Azimuth & Elevation with necessary diagrams.	5
3. a) What are the various steps to launch a Synchronous	s
satellite in orbit? Explain with diagrams.	5
b) Name the different primary launch vehicles.	3
c) What are the two technologies to help a spacecraft	ìt
achieve a synchronous orbit?	2
d) What are the various applications of Satellites?	4
4. a) What are the various activities a spacecraft has to	0
perform on a regular basis to support the	e
communication system it carries?	4
b) What are the various functions of the Attitude & orbita	ıl
control system in a communication satellite?	4
c) With a suitable block diagram, explain the principle o	of

measured?

operation of a Satellite Ranging system. How is Range

6



- 5. a) What is a Satellite Transponder ? Draw a block Schematic of a Transponder model & explain its operation.
  - Explain the concept of Channelization as applicable to a communication satellite with multiple active transponders.
  - c) What is the concept of Dual polarization channelization plan?
- 6. a) Explain the concept of Demand Assigned Multiple

  Access Technique. 2
  - b) What are the different propagation effects in a SatelliteEarth link.5
  - c) Derive an expression for Received power from basicTransmission theory.
- 7. a) Draw the block schematic of Satellite earth station & explain its operation.
  - b) Derive an expression for G/T ratio from fundamental concepts.
  - c) What are the advantages of VSAT? Expalin the concept
     of Direct Broadcast Service.