Satellite Communications
(DE-3.3, Dec-2007)

Note: Section A is compulsory. Attempt any four questions from Section-B and any two from Section-C.

Section-A

1. a) Name and define three modes of multiple access.
   b) Why uplink frequency is kept higher than downlink frequency in satellite communication systems?
   c) Define the terms: geocentric, heliocentric.
   d) What is station keeping of satellite?
   e) What is BER? What is its optimum acceptable value for digital satellite communication?
   f) Differentiate between system noise temperature and carrier-to-thermal noise temperature?
   g) What is meant by burst time plan?
   h) What is the difference between multiplexing and multiple access?
   i) Name the satellites (at least three) launched by India.
   j) List the parameters that control the design of earth station.

Section-B

2. Explain the difference between the active and passive satellite systems. Discuss their merits and demerits.
3. Explain the DA-TDMA burst structure. In what ways is it different from a simple TDMA burst structure?
4. Derive an expression for a digital satellite link and explain how it is dependent on system bandwidth?
5. Draw the block diagram of optical satellite receiver and explain its working.
6. Explain and compare the various laser sources being used in laser communication systems.

Section-C

7. (a) Explain, why time division multiplexing is the only option for digital satellite link and also, why the inter modulation effects are not prevalent in TDM?
   (b) What is meant by tracking and pointing? Explain its significance and the techniques for achieving tracking and pointing.
8. (a) Explain the Erlang's call congestion formula.
   (b) A traffic intensity of 1 Erlang is offered to a group of 3 channels. the average call holing time is 2 minutes. Find the average number of calls arrivals per hour. Find the probability that no call will arrive during a specified period of 2 minutes.
9. (a) Explain optical satellite crosslink in detail? What are the various parameters affecting the working of the link?
   (b) Derive an expression for the resulting downlink signal, after the uplink, crosslink and downlink transmissions have taken place.