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**Sixth Semester B.E. Degree Examination, June/July 2014**  
**Satellite Communication**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. Briefly explain the services provided by the satellite. (05 Marks)  
 b. With neat diagram, briefly explain Kepler's three laws of planetary motion. (09 Marks)  
 c. Briefly explain the following terms of earth orbiting satellite:  
 i) Ascending node      ii) Descending node      iii) Prograde orbit (06 Marks)
- 2 a. A satellite moving in a low earth circular orbit at a height of 700 km from the surface of the earth, calculate:  
 i) Orbital period      ii) Orbital velocity in km/sec      iii) Orbital velocity in rad/sec  
 ( $\mu = 3.986005 \times 10^{14} \text{ m}^3/\text{sec}^2$ , earth radius,  $r_e = 6378.137 \text{ kmt}$ ) (06 Marks)  
 b. An earth station is located at latitude  $35^\circ$  North and longitude  $100^\circ$  West, calculate the antenna look angles for satellite at  $67^\circ$  West. (08 Marks)  
 c. What are the three conditions required for an orbit to be geostationary? (06 Marks)
- 3 a. Write a note on Ionospheric effects on radio waves. (05 Marks)  
 b. Derive an expression for the power received by the earth station antenna or Friis transmission formula. (08 Marks)  
 c. Calculate the gain of 3 mt parabolic reflector antenna at a frequency 6 GHz and 14 GHz (assume  $n_1 = 1$ ). (07 Marks)
- 4 a. Derive the general expression for carrier to noise ratio  

$$\left[ \frac{C}{N_o} \right] = [\text{EIRP}] + \left[ \frac{G}{T} \right] - [\text{LOSSES}] - [K].$$
 (06 Marks)  
 b. Write a note on three axis stabilization of active attitude control of satellite. (06 Marks)  
 c. Briefly explain the telemetry, tracking and command subsystem of satellite. (08 Marks)

**PART – B**

- 5 a. With a neat diagram briefly explain receive only home TV system. (10 Marks)  
 b. Briefly explain the Indoor unit of community antenna TV system. (05 Marks)  
 c. Briefly explain the interference paths between satellite services. (05 Marks)
- 6 a. Briefly explain the channeling scheme for the spade system. (07 Marks)  
 b. With a neat diagram, briefly explain the frame and burst format for a TDMA system. (06 Marks)  
 c. What is satellite switched TDMA? Briefly explain. (07 Marks)
- 7 a. Compare the three multiple access techniques FDMA, TDMA and CDMA. (04 Marks)  
 b. Explain the concept of frequency reuse of DBS-TV system. (06 Marks)  
 c. Briefly explain: i) Transponder capacity of DBS-TV, ii) Bit rate for digital TV. (10 Marks)
- 8 Write notes on:  
 a. VSAT's (05 Marks)  
 b. Radar sat (05 Marks)  
 c. GPS and Iridium (10 Marks)

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