USN ☐☐☐☐☐☐☐☐☐☐

06EC662

# Sixth Semester B.E. Degree Examination, December 2010
## Satellite Communication

Time: 3 hrs.

Max. Marks:100

**Note:** *Answer any FIVE full questions, choosing
at least two questions from each part.*

## PART – A

1   a. What are the frequency bands allocated to various satellite services? **(04 Marks)**
    b. State and explain the Kepler's laws of planetary motion. **(08 Marks)**
    c. Define the terms: i)   Prograde orbit          ii)  Apogee
                          iii) Argument of perigee    iv) Ascending node. **(08 Marks)**

2   a. Determine the rate of regression of the nodes and the rate of rotation of the line of apsides for a satellite making 14.23304826 revolutions / day. The semimajor axis of the orbit is 7192.3 km, orbit eccentricity is 0.0011501 and the inclination is 98.6328 deg. **(08 Marks)**
    b. Explain earth eclipse of satellite. **(06 Marks)**
    c. Differentiate sidereal day and solar day. **(04 Marks)**
    d. Explain sun transit outage. **(02 Marks)**

3   a. Explain atmospheric losses and ionospheric losses for satellites. **(08 Marks)**
    b. The noise figure for the system shown in Fig. Q3 (b) is 12 dB, the cable loss is 5 dB, the LNA gain is 50 dB and its noise temperature is 150 K. The antenna noise temperature is 35 K. Calculate the noise temperature referred to the input. **(05 Marks)**
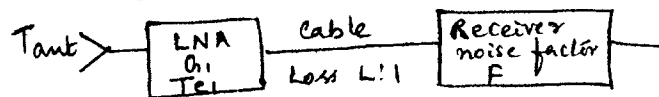


Fig. Q3 (b)

    c. Explain combined uplink and downlink C/N ratio. **(07 Marks)**

4   a. Explain : i)  the power supply subsystem    ii)  the thermal control subsystem. **(08 Marks)**
    b. With the help of a neat diagram, explain the operation of a power amplifier of a transponder along with its transfer characteristics. **(12 Marks)**

## PART – B

5   a. Explain the 'receive only' home TV system. **(13 Marks)**
    b. Explain a MATV system, with a neat diagram. **(07 Marks)**

6   a. An FM/TV carrier is specified as having a modulation index of 2.571 and a top modulating frequency of 4.2 MHz. Calculate the protection ratio required to give a quality impairment factor of (i) 4.2 and    (ii) 4.5. **(06 Marks)**
    b. Explain possible interference nodes between satellite circuits and a terrestrial station. **(07 Marks)**
    c. Explain spade system. **(07 Marks)**

7   a. Explain the following: i) Transponder capacity  ii) Frequencies and polarization. **(08 Marks)**
    b. Explain in detail the satellite mobile services. **(12 Marks)**

8   Write short notes on:
    a. INTELSAT.
    b. Radarsat.
    c. Polar mount antenna.
    d. Iridium. **(20 Marks)**

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