Dronacharya College of Engineering, Gurgaon

Department of Electronics and Computers Engineering

Subject: Satellite Communication(EC-812-F)   **Semester: / Branch: VIIIECS**

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Short Answer questions

Section A

Q 1. What is Satellite?
An artificial body that is projected from earth to orbit either earth (or) another body of solar systems.
Types: Information satellites and Communication Satellites
Q2. Define Satellite Communication.
It is defined as the use of orbiting satellites to receive, amplify and retransmit data to earth stations.
Q3. State Kepler's first law.
It states that the path followed by the satellite around the primary will be an ellipse.
An ellipse has two focal points F1 and F2. The center of mass of the two body system, termed the barycenter is always centered on one of the foci.
$e = [$square root of $(a_2 - b_2)] / a$
Q4. State Kepler's second law.
It states that for equal time intervals, the satellite will sweep out equal areas in its orbital plane, focused at the barycenter.
Q5. State Kepler's third law.
It states that the square of the periodic time of orbit is perpendicular to the cube of the mean distance between the two bodies.
$a_3 = 3 / n_2$

Section B

Q 1. Earth's geocentric gravitational constant. With the n in radians per sec. the orbital period in second is given by,
$P = 2 / n$
Q2. Define apogee.
The point farthest from the earth.
Q3. Define Perigee.
The point closest from the earth.
Q4. What is line of apsides?
The line joining the perigee and apogee through the center of the earth.
Q5. Define ascending node.
The point where the orbit crosses the equatorial plane going from south to north.
Q6. Define descending node.
The point where the orbit crosses the equatorial plane going from north to south

Section C

Q 1. Define true anomaly.

It is the angle from perigee to the satellite position, measured at the earth's center.

Q2.Mention the apogee and perigee height.

r a = a(1+e)

r p = a(1+e)

h a = r a − R p

h p = r p − R p

Q3. What is meant by azimuth angle?

It is defined as the angle produced by intersection of local horizontal plane and the plane passing through the earth station, the satellite and center of earth.

Q4. Give the 3 different types of applications with respect to satellite systems.

• The largest international system (Intelsat)

• The domestic satellite system (Dom sat) in U.S.

• U.S. National oceanographic and atmospheric administrations

(NOAA)

Q5. Mention the 3 regions to allocate the frequency for satellite services.

• Region1: It covers Europe, Africa and Mangolia

• Region2: It covers North & South Ameriaca and Greenland.

• Region3: It covers Asia, Australia and South West Pacific.

Section D

Q 1. What is mean by INTELSAT?

International Telecommunication Satellite.

Q2.. What is mean by SARSAT?

Search and rescue satellite.

Q3.. Define polar-orbiting satellites.

Polar orbiting satellites orbit the earth in such a way as to cover the north and south polar regions.

Q4. Give the advantage of geostationary orbit.

There is no necessity for tracking antennas to find the satellite positions.

Q5. Define look angles.

The azimuth and elevation angles of the ground station antenna are termed as look angles.

Q6. Write short notes on station keeping.

It is the process of maintenance of satellite's attitude against different factors that can cause drift with time. Satellites need to have their orbits adjusted from time to time, because the satellite is initially placed in the correct orbit, natural forces induce a progressive drift.

Q7. What are the geostationary satellites?

The satellites present in the geostationary orbit are called geostationary satellite. The geostationary orbit is one in which the satellite appears stationary relative to the earth. It lies in equatorial plane and inclination is '0'. The satellite must orbit the earth in the same direction as the earth spin. The orbit is circular.