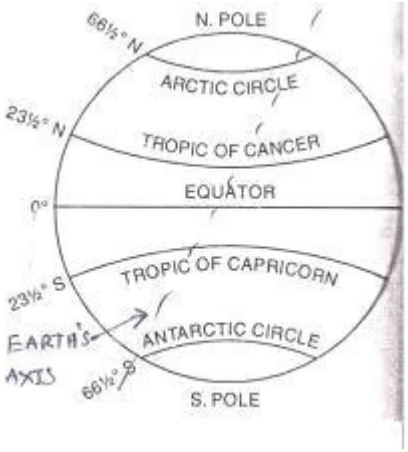
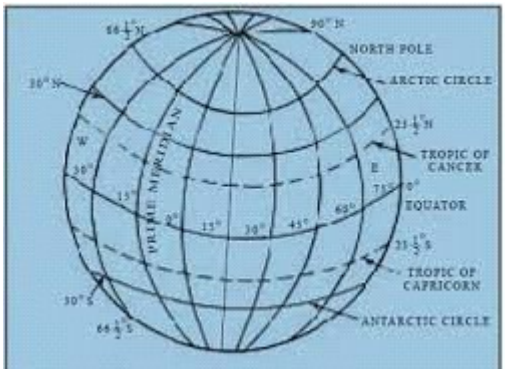
Department of Computer Science
Date: 13th April 2020
Midterm Assignment– Spring 2020
Course Title: Modern Telecom Systems
Instructor: Engr. Latif Jan
Program: BS-Tele
Note: Attempt all Questions:

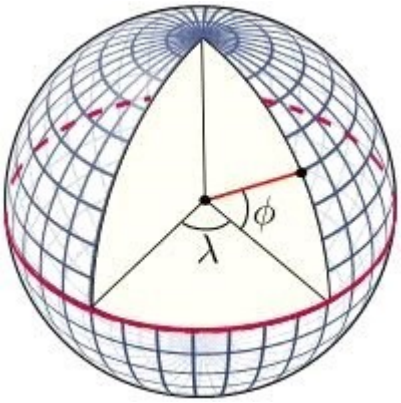
Q1: a) Explain the concepts of Equator, Longitude and Latitude along with the diagram?
Answer.
1. Equator..
the great circle on a sphere or heavenly body whose plane is perpendicular to the axis, equidistant everywhere from the two poles of the sphere or heavenly body.



2. longitude is a geographic coordinate that specifies the east–west position of a point on the Earth's surface, or the surface of a celestial bod



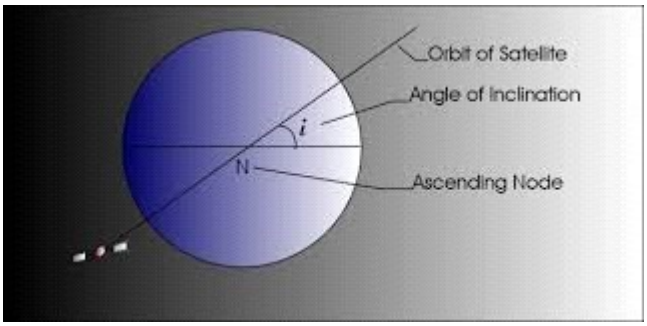
3. Latitude…is an angle (defined below) which ranges from 0° at the Equator to 90° (North or South) at the poles. Lines of constant latitude, or parallels, run east–west as circles parallel to the equator. Latitude is used together with longitude to specify the precise location of features on the surface of the Earth



Explain the difference between an angle of Elevation and angle of Inclination with the help of a diagram?

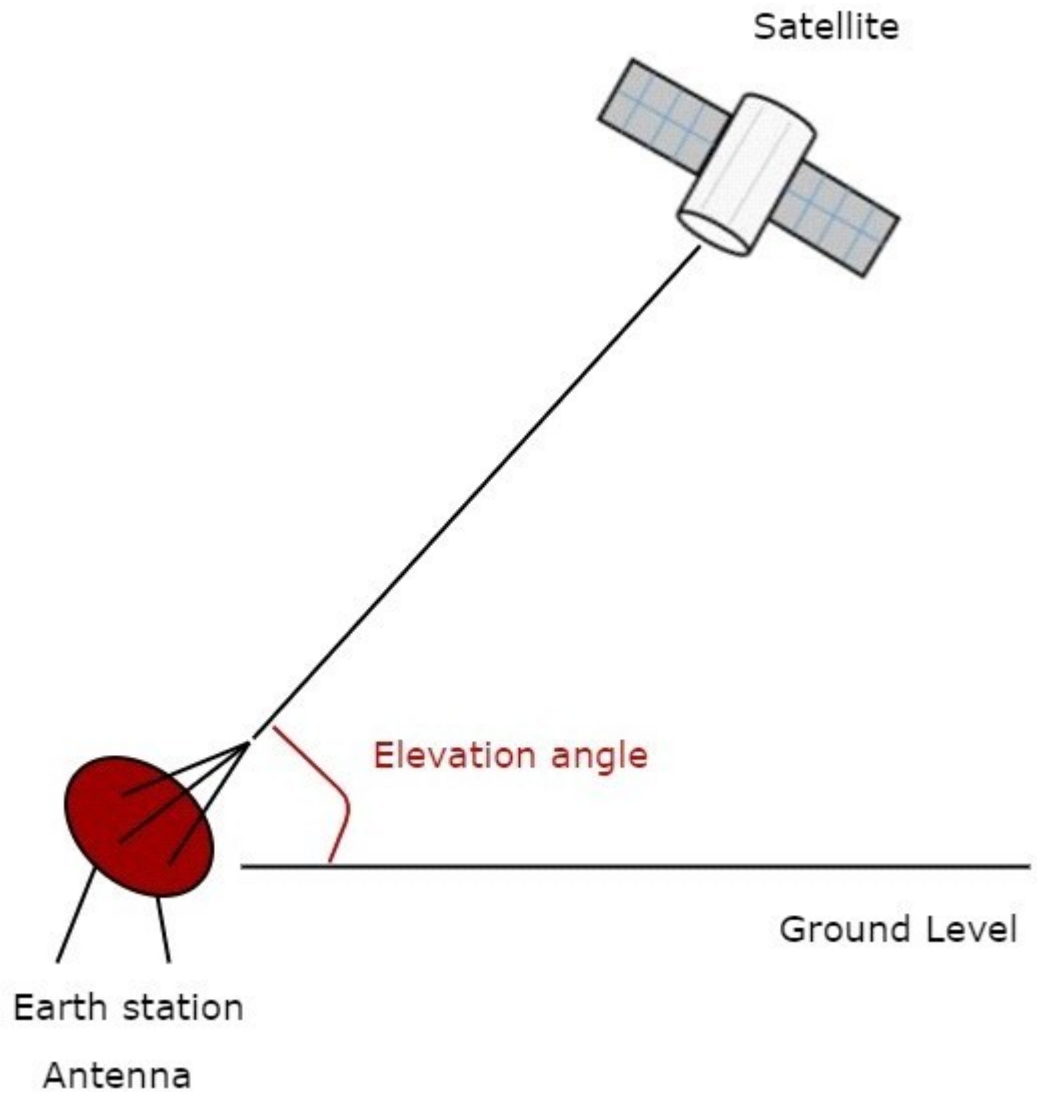
Answer...angle of inclination.

A satellite is said to occupy an inclined orbit around Earth if the orbit exhibits an angle other than 0° to the equatorial plane. This angle is called the orbit's inclination. A planet is said to have an inclined orbit around the Sun if it has an angle other than 0° to the ecliptic plane



.angle of elevation.

The angle between vertical plane and line pointing to satellite is known as Elevation angle. Vertical plane is nothing but the plane, which is perpendicular to horizontal plane.



c) Explain the difference between baseband and broadband transmission**?**

Answer.
The prior difference between baseband transmission and broadband transmission is that in the baseband transmission the whole bandwidth of the cable is utilized by a single signal. Conversely, in the broadband transmission, multiple signals are sent on multiple frequencies simultaneously using a single channe

Q2: a) What are the two main goals of routing algorithm? Discuss. Also highlight the importance of ISL. Answer.

The principle of designing a routing algorithm is to satisfy two goals:

reduce the new call blocking probability, thus increase the system throughput and to achieve this...

a route should be as short as possible in order to minimize the resource usage

a route should avoid going through any congested ISL

reduce the forced termination probability, thus increase the reliability of a connection and to achieve this...

the routing algorithm should provide a larger set of candidate paths such that there is a higher chance of choosing a path for connection ...

Optical Inter Satellite Links for Broadband Networks. Abstract: Inter Satellite Links (ISL)are essential to connect Satellites operating in a constellation. If these ISLs could manage high data rates in Gigabit per seconds the network becomes a broadband connectivity services

b **)** Using (MCA) routing Algorithm. Find the path from source 'S' to destination 'D' that has the minimum load?

.

Answer.The cost of link is 1/vacancy, where vacancy is # of free channels in the link. The chosen path minimizes the sum of the cost of the ISL's

G-M-N-O-P

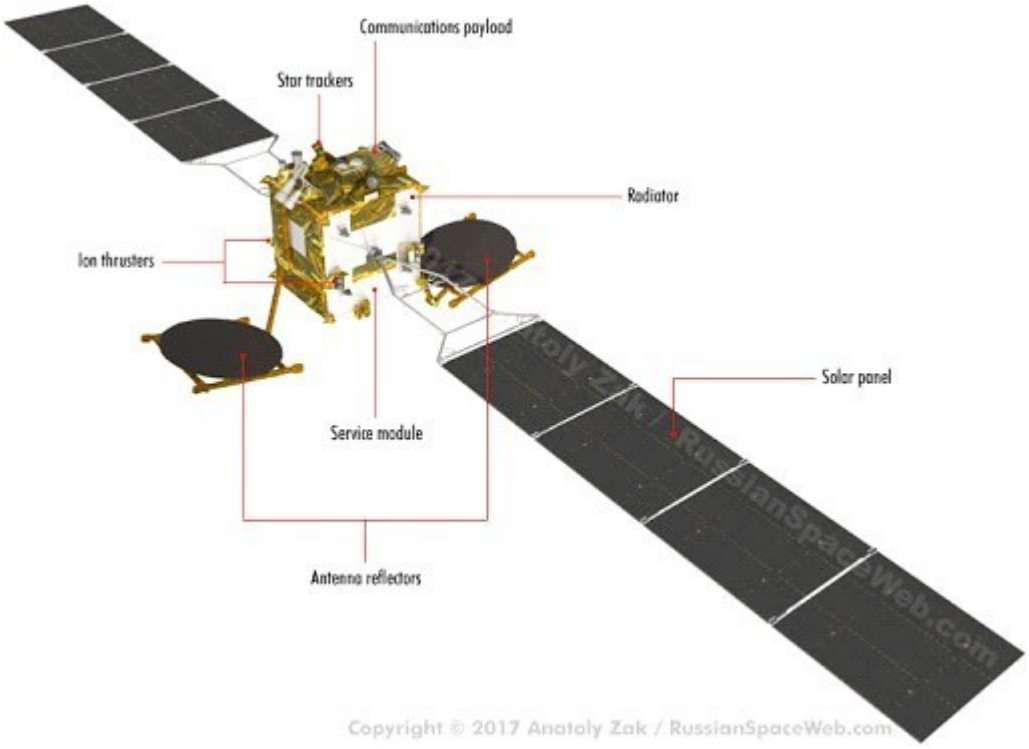
(1/9)+(1/10)+(1/5)+(1/6)=0.57

c) What is a difference between a Half duplex and a Full Duplex communication? Write at least two examples with each one.

Answeer.n simplex mode, only one device can transmit the signal. In half duplex mode, both devices can transmit the signal, but one at a time. In full duplex mode, both devices can transmit the signal at the

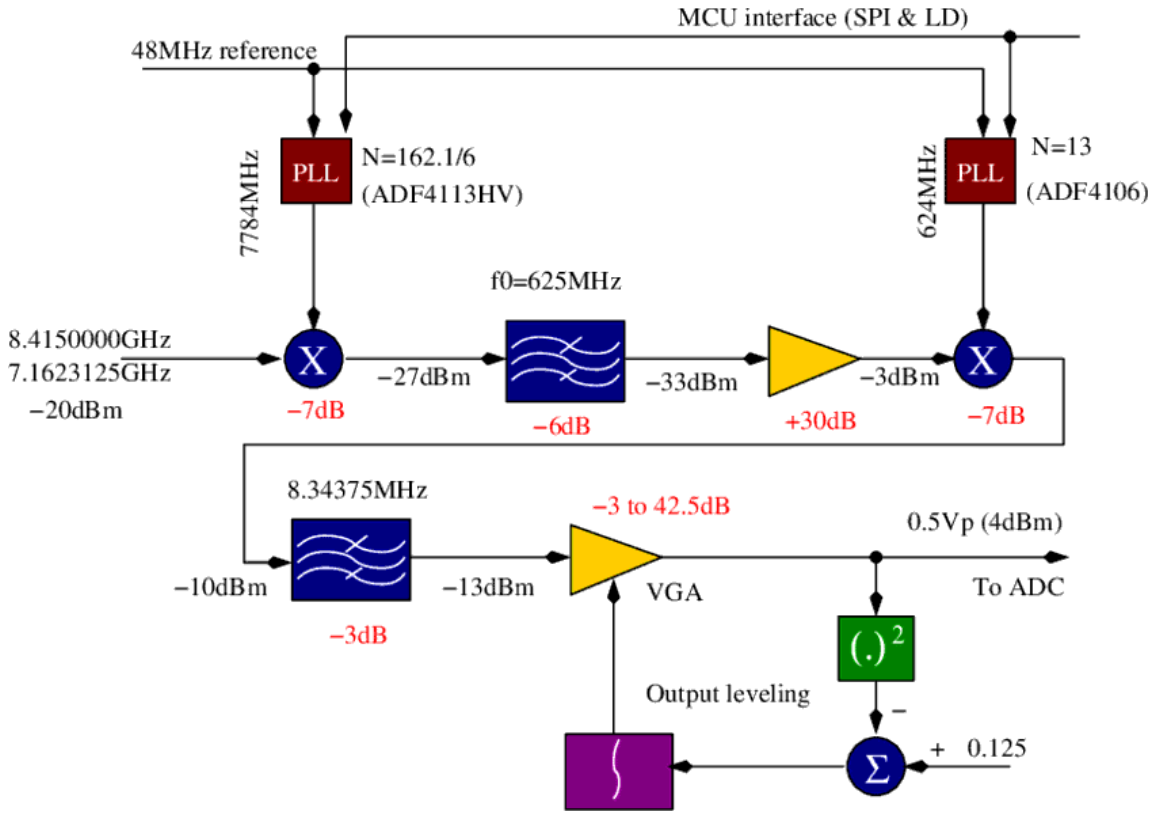
same time. Full duplex performs better than half duplex, and half duplex in turn performs better than simplex.
.example. full deplex. Telephone.,Bluetooth
example of half deplex.Ethernet,Walkie-Talkies

Q3: a) Explain in brief the main components of a Satellite Subsystem? Also draw the diagram.
Answer.A Complete Satellite consists of several subsystems, but the most important of them are as follow: 1) Power Supply System. 2) Attitude and Orbit Control System. 3) Telemetry, Tracking and Command System



b) Where are the Dual-conversion down converters used in the Satellite Communication for RF tuning and IF tuning? Also make their Diagrams.

Answer...frequency converter is based on a dual conversion analog mixing chain that converts both the 8415 MHz downlink via low-side mixing and the 7162 MHz channel via high-side mixing. The block diagram in Fig. 2 gives an idea of the organization and signal properties after each stage. The advantage of doing this simultaneous conversion of the uplink and the downlink (as a result of doing the differential measurement) is that most phase deviations in the uplink reference generator can be made to cancel out in the downlink phase measurement in


MCU interface (SPI & LD)
48MHz reference
PLL
N=162.1/6
(ADF4113HV)
7784MHz
PLL
N=13
(ADF4106)
624MHz
f0=625MHz
8.4150000GHz
7.1623125GHz
−20dBm
X
−7dB
−27dBm
−6dB
−33dBm
+30dB
−3dBm
X
−7dB
8.34375MHz
−10dBm
−3dB
−13dBm
−3 to 42.5dB
VGA
0.5Vp (4dBm)
To ADC
(.)2
Output leveling
−
+ 0.125
Σ