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Continuing Education Course #306
Spacecraft Telemetry & Command

1. For one communications satellite in GEO orbit, the RF signal propagation delay to relay a signal on earth is about _____ seconds - earth transmitter to earth receiver.
 - a. 1/4s
 - b. 1s
 - c. 10s
 - d. 100s
2. As of January 13, 2018, Voyager 1 is about _____ miles away, the propagation delay of its RF signal is about _____ one way.
 - a. 13.1 thousand, 19 seconds
 - b. 13.1 million, 19 minutes
 - c. 13.1 million, 19 minutes
 - d. 13.1 billion, 19 hours
3. Voyager 1 is traveling at a speed of about _____ mph, because it used intense gravitational forces of jupiter for acceleration which produced a sling-shotting effect.
 - a. 35
 - b. 350
 - c. 3,500
 - d. 35,000
4. What characteristic(s) would help describe the RF coverage cone area of a parabolic dish antenna with a very large diameter (e.g. 230ft)?
 - a. stronger signal
 - b. concentrated power
 - c. narrow beam
 - d. all of the above
5. Based on the given equation for link budget (for both uplink and downlink), which of the following need to be larger than all of the losses combined, and large enough to achieve the required link margin.
 - a. rain gain
 - b. received power
 - c. ionospheric gain
 - d. receiver feeder gain
6. For link budget calculations, which loss is the most dominant?
 - a. free-space spreading
 - b. receiver feeder
 - c. antenna misalignment
 - d. atmospheric absorption

7. Attenuation (weakening) of uplink and downlink RF signals increases with frequency in rain, because the size of the RF wavelength approaches that of rain drops.

- a. True
- b. False

8. According to the Atmosphere Layers vs Ionosphere Figure 2.3, the difference in the electron density in cubic centimeters between an altitude of about 250 kilometers compared to 100 kilometers is about _____; also varying with time having different electron density profiles day and night which causes fading of an RF signal due to _____.

- a. 90,000, scintillation
- b. 9,000, free-space spreading
- c. 900, misalignment
- d. 9, absorption

9. The first stage of the telemetry process is _____ of the measurement values.

- a. modulation
- b. demodulation
- c. acquisition
- d. encode

10. The last stage of the command process is to send an analog or digital signal to the _____.

- a. modulator
- b. signal interface
- c. encoder
- d. decoder

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