



ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE
FACULTY OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND COMPUTER
ENGINEERING

FIRST SEMESTER EXAMINATION, 2019/2020 ACADEMIC SESSION
COURSE TITLE: SATELLITE COMMUNICATION

COURSE CODE: ECT 411

EXAMINATION DATE:

COURSE LECTURER: ENGR. O. O AFOLABI

HOD's SIGNATURE

TIME ALLOWED: $2\frac{1}{2}$ HOURS

INSTRUCTIONS:

1. ANSWER QUESTION ONE AND ANY OTHER FOUR QUESTIONS
2. SEVERE PENALTIES APPLY FOR MISCONDUCT, CHEATING, POSSESSION OF UNAUTHORIZED MATERIALS DURING EXAM.
3. YOU ARE **NOT** ALLOWED TO BORROW ANY WRITING MATERIALS DURING THE EXAMINATION.

Question 1

- Telemetry, Tracking, Commanding and Monitoring (TTCM) Subsystem can be grouped into three. State and discuss these three categories. [6marks]
- Why is parabolic reflectors antenna suitable for telecommunications and broadcasting? [3marks]
- Discuss into some details the structure of a VSAT Network. [8marks]
- Differentiate between Prograde and Retrograde orbits. [3marks]

Question 2

- Explain the concept of Isotropic Radiator Antenna. [3marks]
- Identify the components of the Communication Satellite labeled 4, 5, 6, 7, 8, 9 and 10 in Figure 1. [7marks]

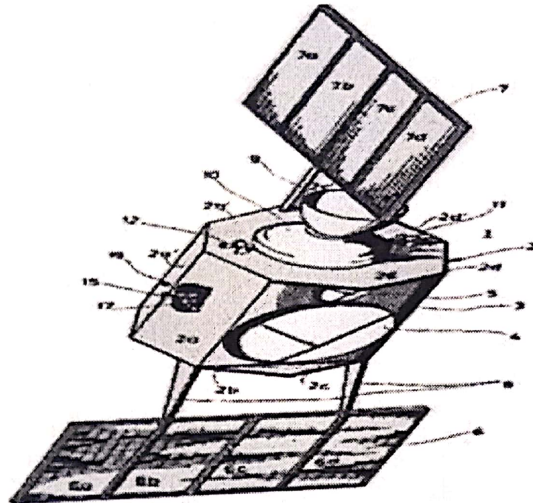


Figure 1

Question 3

- State the four necessities of Multiple Access Systems. 6marks
- One perfect example of Demand Assignment Multiple Access is the radio channels. Diagrammatically describe this. [4marks]

Question 4

- Give three examples of satellite bodies and discuss the features of each of them. [6marks]
- The range between a ground station and a satellite is 36,000 km. Calculate the free-space loss at a frequency of 9.2 GHz. [4marks]

Question 5

- Identify the biggest advantage of TDMA over FDMA. [2marks]
- What is the basic advantage of CDMA? [2marks]
- How can data overlapping be prevented in Multiple Access Systems? [2marks]
- State the two categories of Transmission Losses. [4marks]

Question 6

- Given the semi-major axis of the ellipse a as 0.41, and the semi-minor axis, b as 0.33. Calculate the value of eccentricity e of the satellite. [4marks].
- Identify the two basic types of transponders in the space segment subsystem and state two functions of each of them. [6marks]

Question 7

- State the two types of Power Link Budget calculations. [4marks]
- In a link-budget calculation at 12 GHz, the free-space loss is 206 dB, the antenna pointing loss is 1dB, and the atmospheric absorption is 2dB. The receiver [G/T] is 19.5 dB/K, and receiver feeder losses are 1dB. The EIRP is 48 dBW. Calculate the carrier-to-noise spectral density ratio. [6marks]