PAPER ID-421155

**Roll No:** | | | | | | | | | | | | |

# MTECH
## (SEM II) THEORY EXAMINATION 2021-22
## ADVANCED SATELLITE COMMUNICATION

*Time: 3 Hours*                                                          *Total Marks: 100*
**Notes:**
- *Attempt all Sections and Assume any missing data.*
- *Appropriate marks are allotted to each question, answer accordingly.*

| **SECTION-A** | Attempt **All** of the following Questions in brief | Marks **(10*2=20)** |
|---|---|---|
| Q1(a) | What are the types of Launch Vehicles used for Satellite Launching? | |
| Q1(b) | Define orbital Parameters. | |
| Q1(c) | What are the types of antennas used in Spacecraft? | |
| Q1(d) | Write the equation of system noise factor. | |
| Q1(e) | What is meant by burst position acquisition & burst position synchronization? | |
| Q1(f) | Give the difference between KU-band and the C-band receive only systems. | |
| Q1(g) | Give the expression for G/T ratio and its use. | |
| Q1(h) | Why uplink frequency is higher than downlink frequency? | |
| Q1(i) | Define NAVSTAR GPS? | |
| Q1(j) | What are the building blocks of GPS? | |

| **SECTION-B** | Attempt **ANY THREE** of the following Questions | Marks **(3*10=30)** |
|---|---|---|
| Q2(a) | State Kepler's three laws of planetary motion. Illustrate in each case their relevance to artificial satellites orbiting the earth. | |
| Q2(b) | Draw the block diagram & Explain the System noise temperature. | |
| Q2(c) | Explain the EIRP & Transmission losses. | |
| Q2(d) | Explain TDMA in detail with block diagram. Also write its advantage & disadvantage. | |
| Q2(e) | With a neat sketch, explain the working of GPS receiver. | |

| **SECTION-C** | Attempt **ANY ONE** following Question | Marks **(1*10=10)** |
|---|---|---|
| Q3(a) | What are look angles? Explain how they are determined for geo stationary orbits? | |
| Q3(b) | What are the orbital elements? Explain them. | |

| **SECTION-C** | Attempt **ANY ONE** following Question | Marks **(1*10=10)** |
|---|---|---|
| Q4(a) | Explain the carrier to noise ratio of uplink & downlink frequency. | |
| Q4(b) | With the help of a simple block diagram, explain the function & working of a satellite transponder. | |

| **SECTION-C** | Attempt **ANY ONE** following Question | Marks **(1*10=10)** |
|---|---|---|
| Q5(a) | Explain FDM. Also calculate the Overall Carrier to Noise Ratio on a FDM/FM/FDMA Link. | |
| Q5(b) | Explain how intermodulation noise originates in a satellite link, and describe how it may be reduced. In a satellite circuit the carrier-to-noise ratios are uplink-25 dB; intermodulation 13 dB. Calculate the overall carrier-to noise ratio. | |

| **SECTION-C** | Attempt **ANY ONE** following Question | Marks **(1*10=10)** |
|---|---|---|
| Q6(a) | Derive the expression for C/N for downlink. | |
| Q6(b) | Explain different types of antennas used in satellite communication. | |

| **SECTION-C** | Attempt **ANY ONE** following Question | Marks **(1*10=10)** |
|---|---|---|
| Q7(a) | What is meant by DBS service? How does differ from the home reception of satellite TV signals in the C band? | |
| Q7(b) | Describe the operation of a typical VSAT system. State briefly where VSAT systems have widest application. | |