| PRN: | | Course Code : | PAS204 |
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First Year **M. Tech** End Semester Examination Summer 2024 000469

# Satellite Technology

Day and Date: Fri 6 DEC 2024 Max Marks: **100**

Time : 02:00PM To 05:00PM Duration: **03** hrs

Instructions: All questions are compulsory.

| | | | Marks | Bloom's Level | CO |
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| **Q.1** | | **Attempt the following** | | | |
| | a) | (i) State and Explain Kepler's three laws of motion with suitable diagrams.<br>(ii) Write a brief note on Atmospheric drag. | 08 | 2 | 1 |
| | b) | Illustrate the orbital parameters used for positioning a satellite. | 08 | 2 | 1 |
| | | OR | | | |
| | b) | State and explain the parameters for Earth orbiting satellites. | 08 | 2 | 1 |
| **Q.2** | | **Attempt the following** | | | |
| | a) | Explain the features of typical satellite launch vehicles. | 08 | 2 | 1 |
| | b) | Draw and explain the geometry for determining the sub satellite point. Explain and illustrate the limits of visibility in satellite orbits. | 08 | 3 | 2 |
| | | OR | | | |
| | b) | (i) Explain the orbital perturbations.<br>(ii) What is meant by the geo stationary orbit and also explain the conditions to be required for an orbit to be geo stationary? | 08 | 2 | 2 |
| **Q.3** | | **Attempt any two from the following** | | | |
| | a) | What are the various elements used in the space segments of a satellite system? Explain the need and function of each element in the satellite system. | 08 | 1 | 2 |
| | b) | Briefly explain the sources of noise in satellite communication. What is the importance of noise temperature in link design? | 08 | 2 | 3 |
| | c) | What are the three main systems for tracking satellites? How can tracking systems be affected? Explain. | 08 | 3 | 3 |
| **Q.4** | | **Attempt any two from the following** | | | |
| | a) | Describe the tracking, telemetry and command facilities of a satellite communications system. Are these facilities part of the space segment or part of the ground segment of the system? | 08 | 3 | 3 |
| | b) | Explain Spin Stabilization and Three-axis Stabilization. | 08 | 2 | 4 |
| | c) | Explain what is meant by satellite attitude and briefly describe two forms of attitude control. | 08 | 3 | 4 |

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| **Q.5** | **Attempt any Two of the following** | | | | |
| | a) | Explain the working of telemetry, tracking and control with a suitable diagram. | 09 | 2 | 4 |
| | b) | With a neat block diagram explain the functional elements of a basic digital earth station and also the main elements of a satellite tracking system. | 09 | 2 | 4 |
| | c) | Explain about LEO, MEO & GEO. | 09 | 3 | 5 |
| **Q.6** | **Attempt any Two of the following** | | | | |
| | a) | Discuss in detail about GPS satellite services. | 09 | 2 | 5 |
| | b) | How mobile services are used in satellite communication systems | 09 | 3 | 5 |
| | c) | Describe the main features and services offered by Mobile Satellite Systems. | 09 | 3 | 5 |

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