Code No: **RT42043A** **R13** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

SATELLITE COMMUNICATION

(Electronics and Communications Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) What is Satellite? Define Satellite Communication. Describe briefly the main advantages offered by satellite communication. [4]
   b) What are the basic concepts needed to determine look angles and its ranges? What is anomalistic period (From perigee to perigee)? [4]
   c) What is meant by azimuth angle? [2]
   d) What are the limitations of FDMA- satellite access? [4]
   e) Write about CATV system. [4]
   f) What is meant by P- code in GPS satellite? [4]

PART–B *(3x16 = 48 Marks)*

2. a) Discuss the future trends and advanced concepts relating to the satellite communication. [8]
   b) Draw a basic block diagram of satellite communication system and explain each block in detail. [8]

3. a) Explain the launching procedure of geo-stationary satellites using launch vehicles. Give diagrams. [8]
   b) Explain in detail about of Orbit perturbations. [8]

4. a) Write notes on:
   (i) Space qualification (ii) Satellite antenna equipment reliability [8]
   b) Differentiate the multiplexing and multiple access techniques. [8]

5. a) Explain the TDMA frame structure. [8]
   b) Explain the spread spectrum transmission and reception. [8]

6. a) Which factors influences the design of any satellite communication systems? Explain. [8]
   b) Explain the terminal characteristics and common requirements of NGOS. [8]

7. a) Explain the position location principles of GPS system. [8]
   b) Explain about GPS navigation message. [8]

Code No: **RT42043A** **R13** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

SATELLITE COMMUNICATION

(Electronics and Communications Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) Explain the basic difference between an active and passive satellite. [4]
   b) What is meant by transponder? Write short notes on station keeping. [4]
   c) Write short notes on Geosynchronous orbit and Geostationary orbit. [4]
   d) What are a single access and multiple access techniques? Define the term frequency reuse. [4]
   e) What is an antenna loss? Define noise factor. [2]
   f) How the position location with GPS is obtained? [4]

PART–B *(3x16 = 48 Marks)*

2. a) Write a brief history of Indian satellite communication. [8]
   b) Discuss the various satellite services in brief. [8]

3. What are orbit effects? Which effects the performance of satellite? Explain in detail. [16]

4. a) Explain the satellite antennas. [8]
   b) Explain about 6/4 GHz communication subsystem in detail with neat schematics. [8]

5. a) Explain the design of uplinks and downlinks in detail. [8]
   b) What is the guard time estimation in TDMA? [8]

6. a) Why high power amplifiers are necessary for an earth station? What are its characteristics? [8]
   b) Explain in detail about tracking system in earth station. [8]

7. a) Explain about the GPS receivers and its codes. [8]
   b) Explain about the differential GPS. [8]

Code No: **RT42043A** **R13** **Set No. 3**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

SATELLITE COMMUNICATION

(Electronics and Communications Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) Define Ascending node & Descending Node. Mention the apogee and perigee height. [4]
   b) Give the frequency ranges of VHF, UHF, L, S, and C, X, Ku, K and Ka Bands. [4]
   c) Define following terms. (i) Pitch angle (ii) Frequency Reuse (iii) Spot beam antenna (iv) S/N Ratio [4]
   d) What is an TDMA? What are the advantages? [4]
   e) What is an antenna loss? The Range between a ground station and a satellite is 42000km. calculate the free space loss a frequency of 6 GHZ. [4]
   f) Give the satellite mobile services. [2]

PART–B *(3x16 = 48 Marks)*

2. a) Write a short note on origin of satellite communication. [8]
   b) Explain about the basic components of satellite in detail. [8]

3. a) State the kepler's laws. Discuss its importance in satellite communications. [8]
   b) Explain the effects of the Sun and the Moon on satellite. [8]

4. a) Explain how altitude control is established through various satellite stabilization techniques. [8]
   b) Explain how power is generated in satellite. [8]

5. a) Calculate the C/N with inter modulation. [8]
   b) Explain FDMA of satellite system with one example. [8]

6. a) Draw the transmitter and receiver block diagrams of an earth station and explain its working. [8]
   b) Explain coverage and frequency consideration. [8]

7. a) Explain the trilateration method used for position of GPS receiver. [8]
   b) Explain the function of the non-coherent delay lock loop in GPS receiver. [8]

Code No: **RT42043A** **R13** **Set No. 4**

IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019

SATELLITE COMMUNICATION

(Electronics and Communications Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

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PART–A *(22 Marks)*

1. a) Give and explain the 3 different types of applications with respect to Satellite systems. [4]
   b) Give the two segments of basic satellite communication. Write short notes on attitude control system. [4]
   c) What is meant by spot beam antenna? [2]
   d) What are the methods of multiple access techniques? What is CDMA? Give the types of CDMA. [4]
   e) Define Earth segment. Explain about MATV system. [4]
   f) What are the major sources of error in a GPS receiver? [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain various reasons for preferring satellite communication over optical fiber communication. [8]
   b) Discuss the advantages and disadvantages of satellite communication over other types of communication methods. [8]

3. a) State and derive the expressions for the look angles. Give necessary diagrams. [8]
   b) Explain the procedure of Orbit determination. [8]

4. Explain telemetry, tracking, command and monitoring in detail. [16]

5. a) How does the system noise temperature effect the performance? Derive the expression for overall system noise temperature at the receiving earth station. [8]
   b) Discuss about design of satellite links for specified C/N in detail. [8]

6. a) Explain the delay and through put consideration in satellite systems. [8]
   b) How to determine the optimum orbital altitude? [8]

7. a) With neat sketches explain Global positioning satellite system. [10]
   b) Explain the technology of range error budget used to provide accuracy in GPS C/A code receiver. [6]