**14EC705D**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **February, 2021** | **Electronics and Communication Engineering** | | |
| **Seventh Semester** | **Satellite Communications** | | |
| **Time:** Three Hours | | **Maximum :** 60 Marks | |
| *Answer* ***All*** *Questions from Part - A.* | | | (1X12 = 12 Marks) |
| *Answer Any FOUR Questions from Part - B.* | | | (4X12=48 Marks) |
| **Part - A** | | | |

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| 1 | Answer all questions | | (1X12=12 Marks) | | |
|  | a) | What are the applications of satellite communications? | |  | |
|  | b) | Define Geo Transfer Orbit. | |  | |
|  | c) | What are the ranges of uplink and downlink frequencies? | |  | |
|  | d) | Define the terms Apogee and Perigee. | |  | |
|  | e) | List out the main types of antennas used on satellite. | |  | |
|  | f) | What is Sub Satellite Point? | |  | |
|  | g) | Define G/T ratio of earth station. | |  | |
|  | h) | What are the various forces acting on the satellite in the orbit? | |  | |
|  | i) | What are the advantages of FDMA over TDMA? | |  | |
|  | j) | Write the various applications of GPS. | |  | |
|  | k) | How the position location with GPS is obtained? | |  | |
|  | l) | What are the major sources of error in a GPS receiver? | |  | |
| **Part - B** | | | | | |
| 2 | a) | Draw a basic block diagram of satellite communication system and explain each block in detail. | | | 6M |
|  | b) | Discuss about the Orbital effects in Satellite Communication System performance. | | | 6M |
|  | | | | | |
| 3 | a) | Discuss in detail about LEO, MEO and GEO. | | | 6M |
|  | b) | What are the various satellite launch vehicle selection factors? Explain them. | | | 6M |
|  | | | | | |
| 4 | a) | Explain about the various approaches used to improve the reliability of the satellite. | | | 6M |
|  | b) | What is satellite link equation? Derive the expression for it. | | | 6M |
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| 5 | a) | Explain the altitude and orbit control system (AOCS) with necessary diagrams. | | | 6M |
|  | b) | Low earth orbit satellites use mainly L band, with ranges varying from 1000 km to 2500 km. Calculate the maximum and minimum path loss from earth to a satellite, in dB, for the uplink frequency of 1.6 GHz and down link frequency of 1.5 GHz. | | | 6M |
|  | | | | | |
| 6 | a) | Distinguish between TDMA and FDMA. | | | 6M |
|  | b) | Explain in detail about tracking system in earth station. | | | 6M |
|  | | | | | |
| 7 | a) | Explain in detail about DAMA. | | | 6M |
|  | b) | Explain the operation of VSAT earth station receiver with the help of a neat block diagram. | | | 6M |
|  | | | | | |
| 8 | a) | With a neat block diagram explain the C/A code generation in GPS satellites. | | | 6M |
|  | b) | Explain the GPS receiver operation. | | | 6M |
|  | | | | | |
| 9 | a) | Explain the trilateration method used for obtaining position of GPS receiver. | | | 6M |
|  | b) | What are the different segments in GPS configuration? Explain. | | | 6M |

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| **February,2021** | **Electronics and Communication Engineering** |
| **Seventh Semester** | **Satellite Communications** |

**Scheme of evaluation**

2) a. Block Diagram---2marks

Explanation ----4 marks

b. Explanation of Orbital effects in system performance ---6Marks

3) a Explanation of LEO, MEO & GEO ----2\*3marks=6 marks

b. Launch Vehicle selection factors Explanation --- 6Marks

4) a. Reliability improving approaches Explanation ---6 Marks

b. Satellite Uplink Equation---2marks

Derrivation ---4marks

5) a. AOCS system Diagram--- 2 Marks

Explanation --- 4Marks

b. Given data---2marks

Formula ---2marks

Answer ------2marks

6) a. Comparison of TDMA & FDMA---6 marks

b. Tracking system in earth station diagram---2marks

Explanation ---4marks

7) a. Explanation of DAMA---6 marks

b. Block Diagram---2marks

Explanation ----4 marks

8) a. Explanation about various Error Sources --- 6Marks

b Operation of GPS Receiver with diagram ---6 Marks

9) a. Explanation of Trilatration with diagram ---6marks

b. Explanation of different segments of GPS Configuration --- 6Marks