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**E Reg. No. :**

**Question Paper Code: 52P21**

Ph.D COURSE WORK DEGREE EXAMINATION, NOV 2017

Second Semester

Communication Systems

15PCM201 - SATELLITE COMMUNICATION

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

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| 1. | (a) | (i) List out the six orbital elements and explain them.  | CO1- U |  (10) |
|  |  | (ii) Explain orbital effects in satellite performance. | CO1- U |  (10) |
|  |  | Or |  |  |
|  | (b) |  (i) State Kepler's laws as applied to satellite communications.  Briefly describe the orbital parameters with the help of  diagrams.  | CO1- U |  (15) |
|  |  | (ii) Describe the various satellite services with frequency band  designations.  | CO1- U |  (5) |
|  |  |  |  |  |
| 2. | (a) | (i) Explain the principle of FDMA discuss the interference and  distortion caused by FDMA.  | CO2- U | (10) |
|  |  | (ii) Discuss the calculation of frame efficiency and capacity of  TDMA systems. | CO2- U | (10) |
|  |  | Or |  |  |
|  | (b) | (i) With a block diagram discuss the principles of operation of  frequency division and time division multiple access schemes.  Bring out their advantages and limitations. | CO2- U | (10) |
|  |  | (ii) Explain in detail about the features of tracking and data relay Satellite. | CO2- U | (10) |
|  |  |  |  |  |
| 3. | (a) | Describe about system noise in a satellite link.  | CO3-Ana | (20) |
|  |  | Or |  |  |
|  | (b) | (i) Starting with first principles, obtain the link design equation  with and without frequency reuse. | CO3-Ana | (10) |
|  |  | (ii) Briefly explain about the rain induced attenuation and  interference.  | CO3-Ana | (10) |
|  |  |  |  |  |
| 4. | (a) | (i) Explain the GPS receiver operations and code locking and  message recovery procedures.  | CO4- U | (10) |
|  |  | (ii) Bring out the basic principles used in GPS position and location  identification. | CO4 -U | (10) |
|  |  | Or |  |  |
|  | (b) | Give a brief note on differential GPS in detail.  | CO4- U | (20) |
|  |  |  |  |  |
| 5. | (a) | Explain with neat diagrams the indoor and outdoor units of DBS home receiver in detail.  | CO5- U | (10) |
|  |  | Or |  |  |
|  | (b) | (i) Describe the operation of a VSAT system with its applications. | CO5- U | (10) |
|  |  | (ii) Bring out the significance of satellites in satellite phones,  navigation, weather, earth observations. | CO5- U | (10) |
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