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Reg. No. :

Question Paper Code: 59416

B.E./B.Tech. DEGREE EXAMINATION, MAY 2018

Elective

Electronics and Communication Engineering

15UEC916 - SATELLITE COMMUNICATION PRINCIPLES AND APPLICATIONS

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART A - (5x 1 = 5 Marks)

1. Which of the following is the first commercial satellite?   CO1- R

    (a) Early Bird   (b) Telstar   (c) Explorer   (d) Courier

2. Which noise is related to the microwave radiation?   CO2- U

    (a) Amplifier Noise   (b) Feeder noise   (c) Sky noise   (d) Shot noise

3. A type of satellite's multiple-accessing method that allows all users continuous   CO3- R
    and equal access of the entire transponder bandwidth by assigning carrier
    frequencies on a temporary basis using statistical assignment process.

    (a) TDMA   (b) FDMA   (c) DAMA   (d) CDMA

4. It is spacecraft places in orbit around the earth carrying on-board microwave   CO4- R
    receiving and transmitting equipment.

    (a) Communication satellite   (b) Terrestrial link

    (c) Transponder   (d) Microwave repeater

5. For global communication, the number of satellites needed is   CO5- R

    (a) 1   (b) 3   (c) 10   (d) 5

PART – B (5 x 3= 15Marks)

6. Describe Kepler's third law.   CO1- U

7. A satellite downlink at 12 GHz operates with a transmit power of 6 W and an   CO2- U
    antenna gain of 48.2 dB. Calculate the EIRP in dBW.

8. Define guard time.   CO3- U

9. List out the regions covered by INMARSAT.   CO4- U

10. Tell about GRAMSAT?   CO5- U

PART – C (5 x 16= 80Marks)

11. (a) What are look angles? With neat diagrams, explain how elevation   CO1-U   (16)
         and azimuth angles are determined.

Or

    (b) (i) Determine the limits of visibility for an earth station situated   CO1 -Ana   (8)
             at mean sea level, at latitude 48.42 · north and longitude 89.26·
             west. Assume a minimum angle of elevation of 5·.

         (ii) Discuss about Geostationary orbit.   CO1 -Ana   (8)

12. (a) (i) Examine the system reliability and design life time of the   CO2 -U   (8)
             space segment.

         (ii) EIRP is 49.4dBW. Find the power delivered to the matched   CO2 -U   (8)
             ground station with range of 40000km, downlink frequency=
             4GHz and antenna gain= 50db.

Or

2

59416

(b)	(i) Analyze and express equation for the C/N ratio for the satellite.	CO2 -U	(8)
	(ii) Find the free space loss to transmit the following frequencies. (1)4GHz (2)6GHz (3)12GHz (4)14GHz	CO2 -U	(8)

13. (a) (i) Explain direct sequence spread spectrum communication in detail.   CO3- U   (8)

      (ii) Compare FDMA with TDMA.   CO3- App   (8)

<div align="center">Or</div>

    (b) (i) Show the digital video broadcasting operation in detail.   CO3- U   (10)

      (ii) Explain FDMA in detail and also enumerate the interference in FDMA.   CO3- U   (6)

14. (a) (i) Describe briefly about TT&C subsystems.   CO4-Ana   (8)

      (ii) Compare MATV & CATV.   CO4-Ana   (8)

<div align="center">Or</div>

    (b) Explain the functional elements of a basic digital earth station and also the main elements of a satellite tracking system, with neat block diagram.   CO4 -App   (16)

15. (a) (i) Distinguish the block diagram of an indoor & outdoor unit for a DBS home receiver.   CO5- App   (8)

      (ii) Extend the operation of GPS in detail with necessary diagrams.   CO5- E   (8)

<div align="center">Or</div>

    (b) (i) Explain how DTH operation is carried out with a neat diagram.   CO5- U   (16)

      (ii) Explain in detail about Business Television(BTV).   CO5- U   (16)

59416