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Reg. No. : .....

Name : .....

First Semester M.Tech. Degree Examination, March 2014
(2013 Scheme)
Electronics and Communication Engineering
Stream : Telecommunication Engineering
TTC 1006 : WIRELESS COMMUNICATION AND NETWORKS

Time: 3 Hours Max. Marks : 60

Instructions : *1) Answer **any two** questions from **each** Module.*
*2) **Each** question carries **10** marks.*

MODULE – I

1. a) What do you mean by two ray ground reflection model for path loss ? Discuss about its advantages and disadvantages.

   b) Assume that a mobile transmitter radiates 100W of power, express the transmit power in units of dBm and dBW. If the same power is applied to a unity gain antenna with a 900 MHz carrier frequency, find the received power in dBm at free space distance of 100m from the antenna.

2. a) Explain briefly about the various diversity techniques. Compare the performance of each of these techniques.

   b) Discuss the properties of block codes.

3. a) What are the principal components of a IEEE 802.11 architecture ? Explain.

   b) What is Bluetooth ? How security is ensured in Bluetooth.

MODULE – II

4. a) Discuss about the basic theory of hexagonal cell lay out in mobile communications.

   b) Assume a system of 32 cells with a cell radius of 1.6 km, a total bandwidth that supports 336 traffic channels and a reuse factor of 7. What is the geographic area covered under the proposed system ? How many channels are there per cell and what is the total number of concurrent calls that can be handled ?

5. a) What is handoff in mobile communication systems ? Discuss briefly about the various strategies involved in handling handoff.

   b) Write short note on GPRS.

6. A city with a coverage area of 500 sq. km is covered by a mobile communication tower with a 12 cell s/m, each with a radius of 1.387 km. If the total spectrum allocated is 28.5 GHz with a full duplex channel of 25 MHz. Assume a GoS of 0.02 for an Erlang B s/m and the offered traffic/user is 0.03 Erlangs. Compute

   a) The no. of cells in the service area

   b) The no. of channels per cell

   c) Traffic intensity of each cell

   d) The maximum carried traffic

   e) The total no. of users that can be served for 2 % GOS

   f) The no. of mobiles per unique channel and

   g) The theoretical maximum no. of users that could be served one at a time by the system.

   (Assume A = 84 Erlangs)

MODULE – III

7. a) With a neat sketch illustrate how a satellite link is established between the earth station and satellite. Discuss about the various module and subsystems used in this connection.

   b) An uplink at 14 GHz requires a saturation flux density of – 91.4 dBw/m^2 and an input back off of 11 dB. The satellite G/T is – 6.7 dB/K and the uplink carrier bandwidth is 128 kHz. The uplink carrier-to-interference ratio is 23 dB. Calculate the uplink carrier-to-noise-plus-interference ratio.

8. What are the various interferences that normally occurring in a satellite link. How can these interference losses be compensated ? Explain with specific remarks about all types such interferences.

9. Consider a 60-channel FDM system with a maximum baseband frequency of 252 kHz and a specified top channel SNR of 52 dB. Assume that a FDM multichannel rms frequency deviation of 546 kHz is used. Find :

   i) The bandwidth of the carrier

   ii) FDM multichannel loading factor for 60 channels

   iii) 0dBm test tone rms frequency deviation

   iv) Assume a 6.5 dB improvement in emphasis and psophometric weighting, find the C/N in dB.

(6×10=60 Marks)