Name : ……………………………………………………….

Roll No. : ……………………………………………………

Invigilator's Signature : ……………………………………

CS/M.Tech(ECE/VLSI)/SEM-2/MVLSI-205C/2012

2012

MOBILE COMMUNICATION

Time Allotted : 3 Hours   *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words
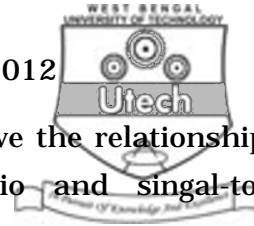*as far as practicable.*

Answer Question No. 1 and any *four* questions from the rest.

1. Answer the following questions :   7 × 2 = 14

   a)   What is antenna sectoring ?

   b)   Define channel capacity.

   c)   What is ISI in context of radio wave propagation ?

   d)   Define slow-start.

   e)   What is skip-distance ?

   f)   Compare between GSM and CDMA.

   g)   Is Bluetooth an ad-hoc network ?

2. a) What is frequency reuse ratio ? Derive the relationship between the frequency reuse ratio and singal-to-interference ratio.

    b) Consider 40 MHz is assigned to a cellular mobile network. The system uses two simplex channels of 20 kHz to provide full-duplex voice and control channels. Calculate the number of channels to be assigned per cell for a cluster size of 12.

    c) Consider a cellular system having 2023 duplex channels to cover 1925 sq.km and each cell area is 5 sq.km for 7-cell reuse system. Compute system capacity. $1 + 5 + 4 + 4$

3. a) Using two-ray ground reflection model find out the path distance between the line-of-sight and the ground reflection.

    b) A mobile is located 5 km away from a base station and uses a vertical $\lambda/4$ monopole antenna with a gain of 2.55 dB to receive cellular radio signals. The *E*-field at 1 km from the transmitter is measured to be 10^{-3} V/m. The carrier frequency used for this system is 900 MHz.

        i) Find the length and effective aperture of the receiving antenna.

        ii) Find the received power at the mobile using two-ray gound reflection model assuming the height of the transmitting antenna to be 50 m and the receiving antenna to be 1.5 m above the ground.

        $8 + 1 + 1 + 4$

4.   a)   With proper diagram describe GSM system architecture.

     b)   Discuss qualitatively about the logical cahnnels of GSM system.   7 + 7

5.   Explain about wireless application protocol (WAP) with diagram of

     a)   WAP protocol stack

     b)   WAP Programming model

     c)   WAP infrastructure.   5 + 4 + 5

6.   a)   Draw and explain the various fields in a IEEE 802.11 MAC frame formal.

     b)   Explain about IEEE 802.11 Physical layer.   7 + 7

7.   a)   Give a description of mobile IP.

     b)   How does mobile IP works ?   7 + 7

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