Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech(ECE)/SEM-2/MCE-203/2011

2011

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

1. Answer any *seven* of the following : 7 × 2 = 14

   a) What do you understand by burst ?

   b) Give the main function of TRAU.

   c) What do you mean by full rate and half rate related to standard codes for voice in GSM ?

   d) What is a router ?

   e) Briefly write about SS7.

   f) Describe PSTN in brief.

   g) When does intersystem handoff occur ?

   h) Explain health hazard issues related to mobile cellular communication system.

   i) What is frequency reuse ?

   j) What do you mean by Tessellation and how is it used in cell design ?

2. a) With an expression, show that how system capacity is effected by cluseter size. 4

   b) Prove that R_u / R = sqrt(3N), where R_u = Reuse distance, R = Cell radius and N = Cluster size. 4

   c) A spectrum of 30 MHz is allocated to a wireless FDD cellular system which uses two 25 kHz simplex channel to provide full duplex voice & control channels. Compute the number of channels available per cell if a system uses (i) 4 cell reuse and (ii) 7 cell reuse. 6

3. a) Deduce the expression to find the nearest co-channel neighbour. 4

   b) What is co-channel interference and how does it affect the system capacity ? 2 + 3

   c) For a given path loss exponent (i) n = 4 and (ii) n = 3, find the frequency reuse factor & the cluster size that should be used for maximum capacity. Minimum required S/I is 15 dB and number of co-channel cells is 6. 5

4. a) Explain in detail any two basic group of logical channels specified in GSM. 7

   b) Illustrate the different switches and databases of a Network and Switching Subsystems (NSS) of GSM architecture. 7

5. a) Explain the relevance and use of propagation models in Mobile Radio Propagation. 2

b) Derive the Friis free space equation for received power *Pr* at a distance *d* in terms of transmitted power, distance and wavelength. 5

c) Explain path loss and derive path loss for free space model. 2

d) Explain the validity of prediction for *Pr* by Friis free space model. 2

e) Describe the basic propogation mechanism which impact wave propagation in mobile communication system. 3

6. a) What is the need for protocol architecture ? Describe the TCP/IP protocol architecture. 5

b) Distinguish between circuit switching and packet switching. 3

c) Define any three of the following : 3 × 2

i) Flat fading

ii) Frequency selective fading

iii) Coherence BW

iv) Coherence time.

7. a) Explain in detail all the three types of encapsulation namely :

   i) IP in IP encapsulation

   ii) Minimal escapsulation

   iii) Generic routing encapsulation. 9

   b) Explain the process of MN registration in a mobile IP network. 5