Communication Systems Group (CSG)

Prof. Dr. Burkhard Stiller, Universität Zürich, Binzmühlestrasse 14, CH-8050 Zürich
Telefon: +41 44 635 6710, Fax: +41 44 635 6809, stiller@ifi.uzh.ch
Dr. Corinna Schmitt, Telefon: +41 44 635 7585, schmitt@ifi.uzh.ch
Sina Rafati, Telefon: +41 44 635 6702, rafati@ifi.uzh.ch

Exercise Sheet 4

Mobile Communication Systems

Handout: 22.03.2017
Hand-in latest: 27.03.2017 (23:58) per Email to Corinna **and** Sina including full name, Email, and student ID
Discussion: 29.03.2017 (start 10:00 a.m.)

1.   Telecommunication Systems

1.1.   Explain the role of Mobile Switching Center (MSC).
1.2.   How are SDM, FDM, and TDM used in GSM networks?
1.3.   Explain the Mobile Terminated Call (MTC) procedure step by step.
1.4.   Explain the Mobile Originated Call (MOC) procedure step by step.
1.5.   What are the two main reasons for a handover in GSM networks?
1.6.   Name the 4 types of handovers in GSM networks.
1.7.   Explain the GSM authentication procedure step by step.
1.8.   Explain how encryption in GSM works.
1.9.   What new data services for GSM do you know? How do they work?
1.10. Explain the relation of BSS, BTS, BCS and interconnections in radio subsystem of GSM architecture.
1.11. Which component in GSM architecture is responsible for each of the following tasks?
   A) Handover management
   B) Mobility specific signaling
   C) Authentication
   D) Network resource managing
   E) Encryption and decryption
   F) Storing information of users
   G) Traffic monitoring
1.12. Draw a complete architecture of GSM network, numerate the connections between components, and for each connection explain in 1 or 2 sentences the relation of connected components.
1.13. Draw the GSM TDMA frame in detail and explain the training header.
1.14. What is DECT? How is it different to GSM? What are its main application scenarios?
1.15. What is TETRA? What are its main application scenarios?
1.16. Explain the evolution of mobile communications from 1G to 4G. What are its main characteristics?
1.17. Why is implementing a global standard for mobile communications difficult?
1.18. How does multiplexing work at the GSM radio interface?
1.19. Name one circuit switching solution used for mobile (radio) communication and one for landline.

1.20. How can you reduce the guard times in TDMA?

1.21. When the power of a base station doubles, how does the range of the cell changes?

1.22. Which component of GSM architecture has the role of localization managing. In order to locate a mobile node and address the mobile station which numbers are required.

1.23. Draw the GPRS architecture and explain the components. Numerate the connections and expalin why are those components are connected?

1.24. Draw the protocol arichteure of signaling in GSM network and explain the role of components below:
   a) LAPD
   b) Physical layer's main tasks and which tools are used for addressing those tasks.
   c) Mobility Management (MM)
   d) Call Management (CM)

1.25. What are the two main sytems used for GSM's approach in enhancing data transmission capabilities? Give a brief explanation for each system.

Mail your submission to both of us:

schmitt@ifi.uzh.ch and rafati@ifi.uzh.ch