

1. Select true/false (T/F) in the following questions (correct answer yields 1p, wrong answer yields -1p, no answer yields 0p):

- a) 802.11a networks operate at 2.4 GHz
- b) The maximum data rate of Bluetooth communications is 1.55 Mb/s
- c) The 802.11 MAC protocol does not implement collision detection
- d) The 802.11 standard supports add-hoc networking
- e) DECT is based on TDD (Time Division Duplexing)
- f) ATM cells can be carried in an SDH virtual container (e.g.VC-4)
- g) Group calls involving a dispatcher are possible in DECT
- h) SIP (Session Initiation Protocol) enables terminal mobility
- i) SCTP (Stream Control Transmission Protocol) is an alternative to TCP
- j) MPLS (Multi-Protocol Label Switching) is a "best effort" service

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2. Describe how operation and maintenance functions are categorized and realized in the PSTN; Briefly explain the functions.
3. Please answer the following questions using not more than 30 words per topic:
- a) How is user authentication (not PIN code usage) implemented in GSM?
 - b) What does "PDP Context" mean, and what does it basically consist of?
 - c) Give an example of an IN (Intelligent Network) service where address translation is used.
 - d) How can the address space limitation in IP version 4 be circumvented (other than changing to IP version 6)?
4. a) Compare transmission of data services and interactive speech services with respect of their sensitivity to delay, throughput and errors. How would you preferably transmit streaming applications, why?
- b) Define what is meant by value added services? Mention at least five of them.
- c) In an ATM switch, ATM cells are transported from an incoming logical channel to one or more output logical channels. Describe how a logical channel is indicated.
- d) Describe briefly what is meant by Time-slot Interchange (TSI). Determine the number of slots required for the memory cycle time of 125 ns in a T-1 carrier (1544 kbit/s). What is the maximum number of accommodated connections?
5. Describe the signalling that is necessary when a PSTN user (User A) calls a GSM user (User B) located in a different country. Describe the tasks of the following network elements during call setup: PSTN phone, local exchange, GMSC, MSC, HLR, BSC (base station controller), base station, and GSM terminal.