S-72.1130 Telecommunication Systems   Exam 3.9.2008

1. *Indicate whether the following statements are TRUE or FALSE (for each statement, correct answer: 1p, wrong answer: -1p, no answer: 0p):*

   a) DIFS, PIFS and SIFS of 802.11 MAC take care of throughput adaptation for service classes.
   b) CSMA/CD is used in WLANs to avoid hidden terminal problem.
   c) Network Echo Canceller (NEC) is more effective than Network Echo Suppressor (NES).
   d) X.25 has more error correction overheads than Frame relay.
   e) In ISDN, 2B+D = 2*256 kb/s+32 kb/s.
   f) The European 2 Mbit/s PDH system (E1) can carry 31 PCM signals.
   g) Up to 64 E1 signals can be carried in a single STM-1 SDH system.
   h) Message Transfer Part (MTP) is a protocol (or set of protocols) used in SS7.
   i) FDMA, TDMA and CDMA are random access methods.
   j) Signalling point code (SPC) is always included in the STM-1 section overhead (SOH).

2. *Please answer the following questions using __not more than 50 words__ per topic (subsequent words will be disregarded) and/or a figure: (5 p each)*
   a) Describe the function of physical layer and name two protocols that work especially in this layer
   b) Explain the basic functionalities of HDLC.

3. *Please answer the following questions using __not more than 50 words__ per topic (subsequent words will be disregarded) and/or a figure: (5 p each)*
   a) Describe connection orientated and connectionless switching and mention an example of both.
   b) Carrier sensing in 802.11 MAC

4. *Please answer the following questions with __not more than one sentence__: (1 p each)*
   a) What does ISDN user part (ISUP) mean?
   b) What does "ITU E.164 numbering scheme" mean?
   c) What is the main difference between channel associated signalling (CAS) and common channel signalling (CCS)?
   d) What does handover (US: handoff) mean in a cellular mobile network?
   e) Why is paging needed in a cellular mobile network?
   f) What does "random access" mean in a cellular mobile network?
   g) What does classless interdomain routing (CIDR) mean?
   h) What does network address translation (NAT) mean?
   i) Write a valid IPv4 address.
   j) Write a valid IPv6 address.

5. *Please answer the following questions using __not more than 50 words__ per topic (subsequent words will be disregarded) and/or a figure: (2.5 p each)*
   a) Explain the meaning of PDP context.
   b) List (and shortly explain) four typical Intelligent Network (IN) services.
   c) Explain how a user is authenticated in a GSM network (not PIN code…).
   d) Compare the transport layer protocols TCP and SCTP. What are the main benefits of SCTP?