

S-72.1130 Telecommunication Systems

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

- a) X.25 has more error correction overheads than Frame Relay.
- b) In ISDN, $2B+D = 2 \cdot 256 \text{ kb/s} + 32 \text{ kb/s}$
- c) E1 (2 Mbit/s PDH system) offers at least 30 TDM time slots for PCM traffic.
- d) Network Echo Canceller (NEC) is more effective than Network Echo Suppressor (NES)
- e) Intelligent peripheral (IP) can receive DTMF digits dialled by the user.
- f) CSMA/CD is used in WLANs to avoid hidden terminal problem.
- g) Point Coordination Function realizes connection-oriented data paths
- h) Channel associated signaling can be used for signaling to/from a database.
- i) Message Transfer Part (MTP) level 3 takes care of subscriber signaling.
- j) The OSI Network layer takes care of end-to-end flow and error control.

2. *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) Discuss how devices can be connected to FDDI (Station-attachment types).
- b) Summarize functions of Line Interface Circuit (LIC).
- c) Describe the function of physical layer and name two protocols that work especially in this layer.
- d) Describe the functionalities of Digital Circuit Multiplexing Equipment (DCME).

3. *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 principle of DMT.
- b) What is the most important difference between TCP and UDP when QoS requirements of applications are concerned?
- c) Service sets of 802.11.
- d) What is the Fast Sync Byte? What kind of functionalities it carries?

4. *Please explain the following as short as possible and using sequence diagrams: (5 p each)*

- a) Explain the main signaling events taking place when setting up a circuit-switched call in the PSTN, where the destination of the call depends on the time of the day (morning – evening).
- b) Explain the main signaling events taking place when setting up a mobile terminated call (MTC) in a GSM network.

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 hierarchical IPv4 address structure.
- b) What is the purpose of using SCTP (Stream Control Transmission Protocol)?
- c) Explain the difference between terminal and personal mobility.
- d) How are ATM cells packed into STM-1 frames?