

# CSE3020 Network Technology

## Semester 1, 2004

### Tutorial 5 -Week 6

**Question T5.1** - Explain in terms of data link control and physical layer concepts how error and flow control are accomplished in synchronous time-division multiplexing.

**Question T5.2** - One of the 193 bits in the DS-1 transmission format is used for frame synchronization. Explain its use.

**Question T5.3** - Twenty-four voice signals are to be multiplexed and transmitted over twisted pair. Assuming each voice signal is 4 kHz, and the guard band is 200 Hz, what is the minimum bandwidth required for FDM? Assuming a bandwidth efficiency (ratio of data rate to transmission bandwidth) of 1 bps/Hz, what is the bandwidth required for TDM using PCM?

**Question T5.4** - How is one TDM signal separated into its original components? Consider both synchronous TDM and statistical TDM implementations.

**Question T5.5** - Ten 9600-bps lines are to be multiplexed using TDM. Ignoring overhead bits, what is the total capacity required for synchronous TDM? Assuming that we wish to limit average line utilization of 0.8, and assuming that each line is busy 50 percent of the time, what is the capacity required for statistical TDM?

**Question T5.6** - Briefly describe the basic and primary interface of an Integrated Services Digital Network (ISDN).

**Question T5.7** - ADSL uses FDM to exploit the 1-MHz capacity of twisted pair. Briefly describe the discrete multitone (DMT) transmission technique used in ADSL.