CSE320

Quiz-4

Time: 25 Min

Total Marks: 15

Name:	ID:	Section:

1. **Consider** there are six channels, two with a bit rate of 130 kbps and four with a bit rate of 65 kbps, which are to be multiplexed using **multi-level TDM** with one synchronization bit. **[8 Marks]**

   Write the following answers:

   a) How many input channels are there after doing **multi-level** TDM?
   b) What is the input bit duration before multiplexing?
   c) What is the size of a frame in bits?
   d) What is the frame rate?
   e) What is the duration of a frame?
   f) What is the data rate?
   g) What is output slot duration?
   h) What is the output bit duration?

2. The 2-bit datawords are converted to the following 6-bit codewords. H**ow** many bits can we successfully detect and correct errors using this scheme? **[4 Marks]**

Dataword	Codeword
00	00000
01	10101
10	01011
11	11110

3. In a communication system, there are multiple channels that need to share the available bandwidth using a multiplexing technique. Suppose the system has 8 channels, each requiring 150 kHz of bandwidth to operate effectively. The total bandwidth available for multiplexing is 1500 kHz. To avoid interference between adjacent channels, guard bands are used to separate them. **Determine** how many guard bands are necessary in this scenario, and **calculate** the total bandwidth allocated for these guard bands. Additionally, **find out how much** bandwidth is assigned to each guard band if the total guard band bandwidth is distributed equally. **[3 Marks]**

Bonus

4. A telecommunication system uses an FDM hierarchy where 10 voice channels, each with a bandwidth of 4 kHz, are multiplexed to form a group. At the next level, 8 groups are multiplexed into a composite signal called a supergroup, with an additional 3 kHz guard band for the supergroup. Finally, 12 supergroups are multiplexed to create a master group, with 4 kHz guard band required at this level. How many voice channels can be multiplexed together in the master group, and what is the total bandwidth required for the master group? **[2 Marks]**