



Assignment # 4

Instructions :

Your assignment must be uploaded/submitted before or on **16th June 2011**.

- Your assignment must be in .doc format.(Any other formats like scan images, PDF, Zip, rar, bmp, docx etc will not be accepted)
- Save your assignment with your ID (e.g. bc020200786.doc).
- No assignment will be accepted through email.

It should be clear that your assignment will not get any credit if:

- The assignment is submitted after due date.
 - The submitted assignment does not open or file is corrupted.
 - Your assignment is copied from internet, handouts or from any other student (Strict disciplinary action will be taken in this case).
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Question 1:

[5]

A telephone line normally has bandwidth of 5000 Hz, the signal to noise ratio is usually 25dB. Calculate the capacity of the channel?

Solution:

$$\text{dB} = 10 \log_{(10)} (\text{S/N})$$

$$\text{S/N} = \text{Antilog} (25/10)$$

$$\text{S/N} = 316.227 \text{ watt}$$

$$\text{Now } B=5000$$

We have the formula by **Shannon capacity**

$$C=B \log (\text{base } 2) (1+\text{S/N})$$

$$C=5000 \log (\text{base } 2) (1+316.227)$$

$$=5000 \log (\text{base } 2) (317.227)$$

$$=5000*8.30$$

$$=41500\text{bps}$$

Question 2:**[10]**

Why Digital transmission is preferred over analog transmission justify your answer with five solid reasons?

Solution:

When we need to have fast and reliable communication we opt for digital communication both long-haul telecommunications facilities and intra building services which are gradually being converted to digital transmission and, where possible, digital signaling techniques. The most important reasons are:

Reasoning:

- **Digital technology.** The advent of large-scale integration (LSI) and very large scale integration (VLSI) technology has caused a continuing drop in the **cost and size** of digital circuitry.
- **Data integrity.** By the use of repeaters rather than amplifiers, the effects of noise and other signal impairments are not growing. Due to this, it is possible to transmit data over longer distances.
- **Capacity utilization.** It has become economical to build transmission links of very high bandwidth, including satellite channels and connections involving optical fiber. Due to time division multiplexing technique.
- **Security and privacy.** Encryption techniques can be eagerly applied to digital data
- **Integration.** It is convenient to integrate voice, video, and digital data. As it is flexible and easy to manipulate.

Note:

- Your answer must follow the below given specifications. **Marks will be deducted if you do not follow these instructions.**
 - Font style: “Times New Roman”
 - Font color: “Black”
 - Font size: “12”
 - **Bold** for heading only.
 - Font in *Italic* is not allowed at all.

- You should consult recommended books to clarify your concepts.
- It's better for you to submit the assignment well before the deadline.
- Do not put any query at MDB about this assignment, if you have any query then email at CS601@vu.edu.pk