Date: / /

Final-term Assignment

Data Communication and Networks.

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Dept #:- BSCCS)

Submitted to:- Sir Ghassan

(Q.1)
(a)
(Answer).

Solution:-

For 10 channels, we need at least 9 guard bands. This means that the required band-width is at least

$10 \times 4 + 0.5 \times 9 = 44.5 \text{ KHz}$

(Q.1)
(b)
(Answer)

Solution:-

In case $r = 4$, $S = 3000$ and N is unknown let find the value of N from below formula

$S = N \times 1/r$ or $N = S \times r$

$N = 3000 \times 4 = 12000 \text{ bps}$.

Date: / /

Syed Danish Ali 14712

~~(Q.2)~~
~~(c)~~
~~(Answer).~~

(Q.1)
(c)
(Answer)

- Data Element and Signal Element:

- A data element is the smallest piece of information to be exchanged, the bit.

- A signal element is the smallest unit of a signal that is constant.

(=)

(Q.1)
(d)
(Answer).

- Link refers to the physical path while channel refers to the portion of a link that carries a transmission b/w a given pair of lines.
- One Link can have many (n) channel

Date: / /

(3)

Syed Danish Ali

14712

(Q.1)

(e)

(Answer)

The three different techniques in serial e transmission are

i) Asynchronous - In this, we send 1 start bit at the beginning and 1 or more stop bits at the end of each byte i.e irregular intervals.

ii) Synchronous - In this, we send bits in a serial order without any gaps, i e regular intervals.

(iii) isynchrouynous - It sendsa block of data asynchronously

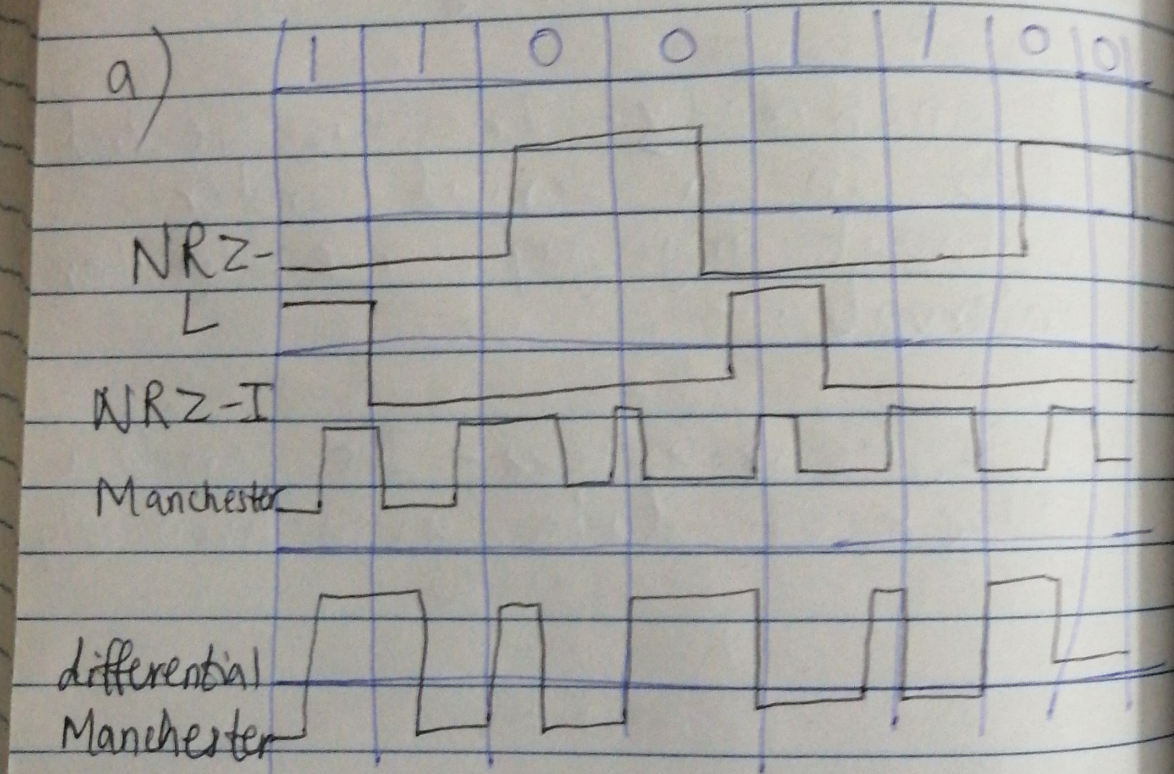
Date: / /

Syed Danish Ali: 14712

(2.2)
(a)
(Answer)

- Differential Manchester
  = 11000100 Ans

2.2
(b)
(Answer)

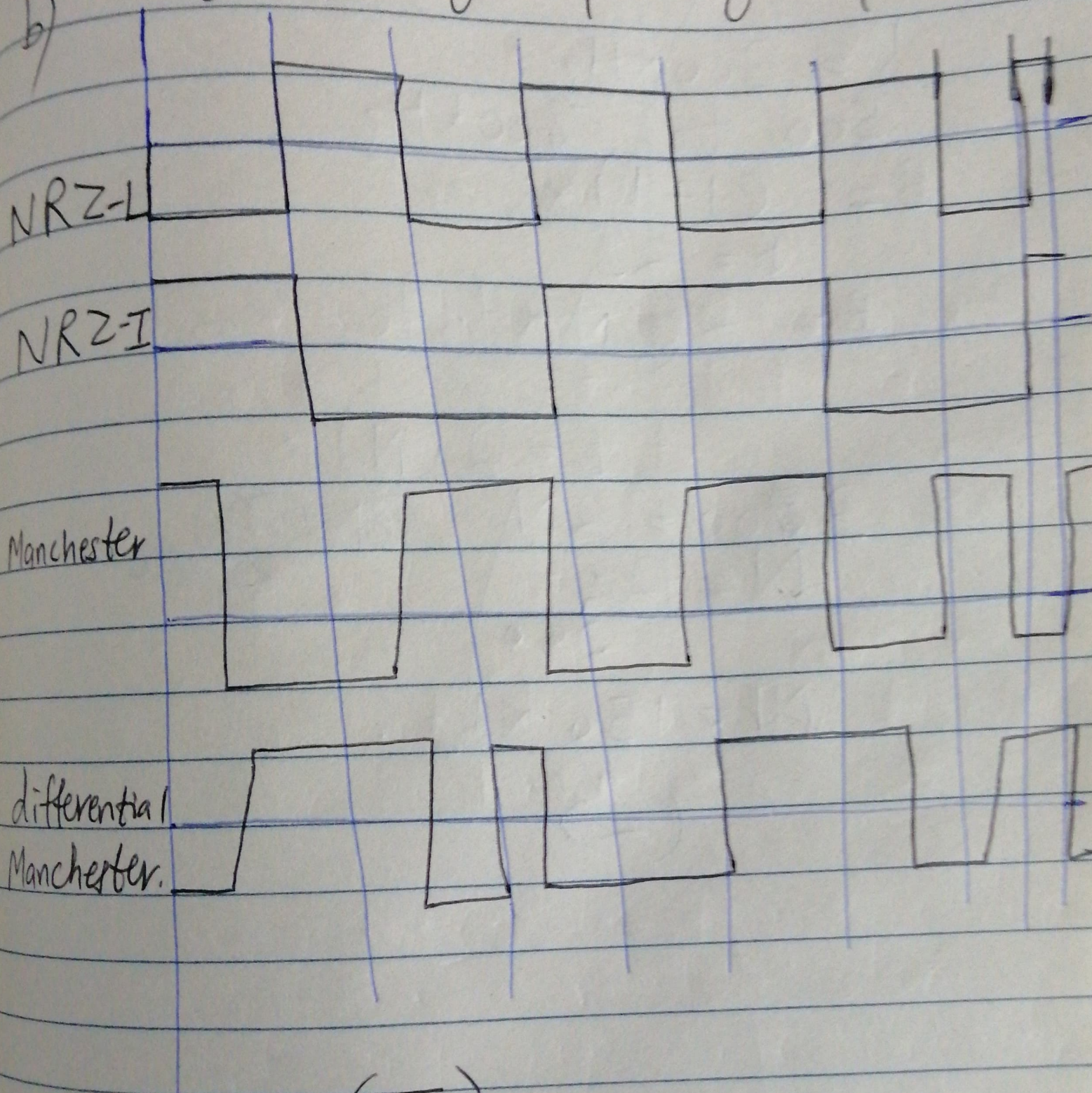


(5)

Date: / /

Syed Danish Ali 14712.

b)



(=)

(2.5)

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(Q.2)
(c)
(Answer).

Band width = Highest frequency − Lowest frequency

950 kHz = X − 450 kHz

X = 950 + 450 = 1400 kHz.

Nyquist Sampling Rate => should be at least twice the maximum frequency

Hence,

Nyquist Sampling Rate = 2 * 1400 kHz

= 2800 kHz.

(=)

Date: / /

Syed Danish Ali 14712

(Q.3)
(a)
(Answer).

The middle of the Bandwidth is located at 650 KHz. This means that our carries frequency can be at $f_c = 650$ KHz

We can use the formula for Bandwidth to find the bit rate with a = 1

$B = 300$ KHz
500 to 800 kHz

$B = (1 + a) \times S$

$B = 2S$ $\quad \because S = N \times 1/r$

$B = 2(M \times 1/r)$

$300 = 2(M \times 1/r)$

$300 = 2(M \times 1/r)$

$N = \frac{300}{2} \Rightarrow$ N = 150 kbs

Ans

Date: / /

Syed Danish Ali 14712

(Q.3)
(b)
(Answer).

- Binary Amplitude Shift Keying:-

⇒

* Although we can have several levels of signal element each with a different amplitude ASK is normally independent using only two levels.

* This is refererred to as binary amplitude shift keying or on-off keying (ook).

* The peak amplitude of one signal level is 0; The other is the same as the amplitude of the carrier frequency.

Date: / /

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(Q.4)
(a)
(Answer).

- FDM:- It is multiplexing techniques designed for analog signals. It is applied where the bandwidth of link is greater than the combined bandwidths of the signal to be transmitted

- In this, signals generated by each sender device modulate different carrier frequencies.

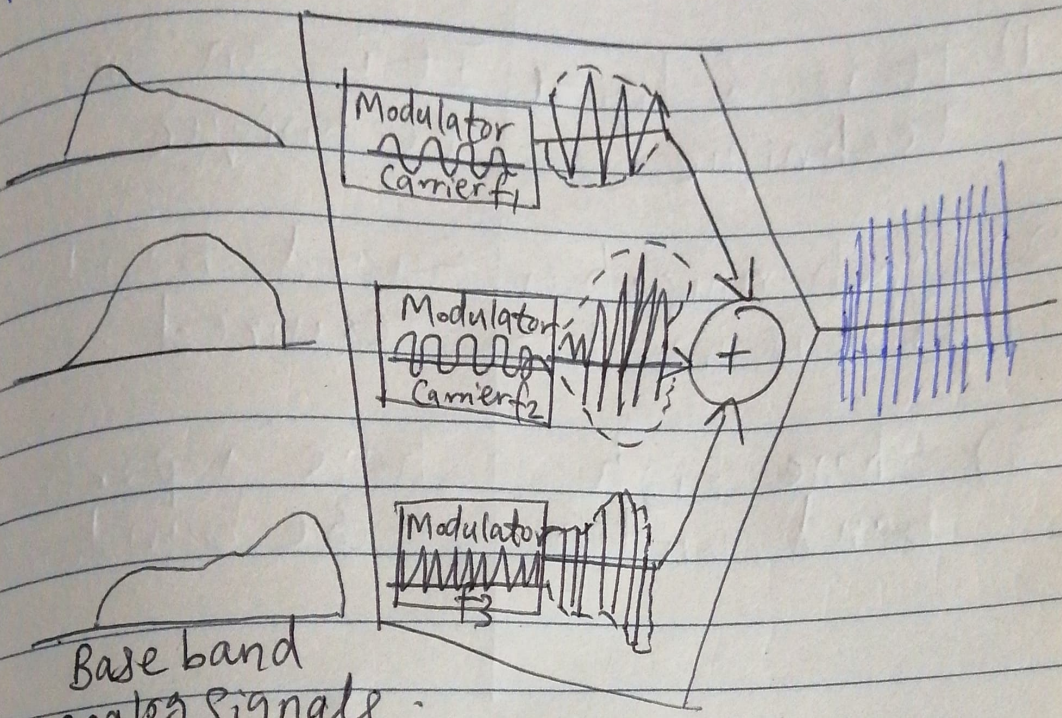
- Then those modulated signals are formed into one composite signal which can be transmitted through link.

- De-multiplexing process:- It use a series of filter that decompose the multiplex signal into its original component signals. Each signal are passed to a demodulator

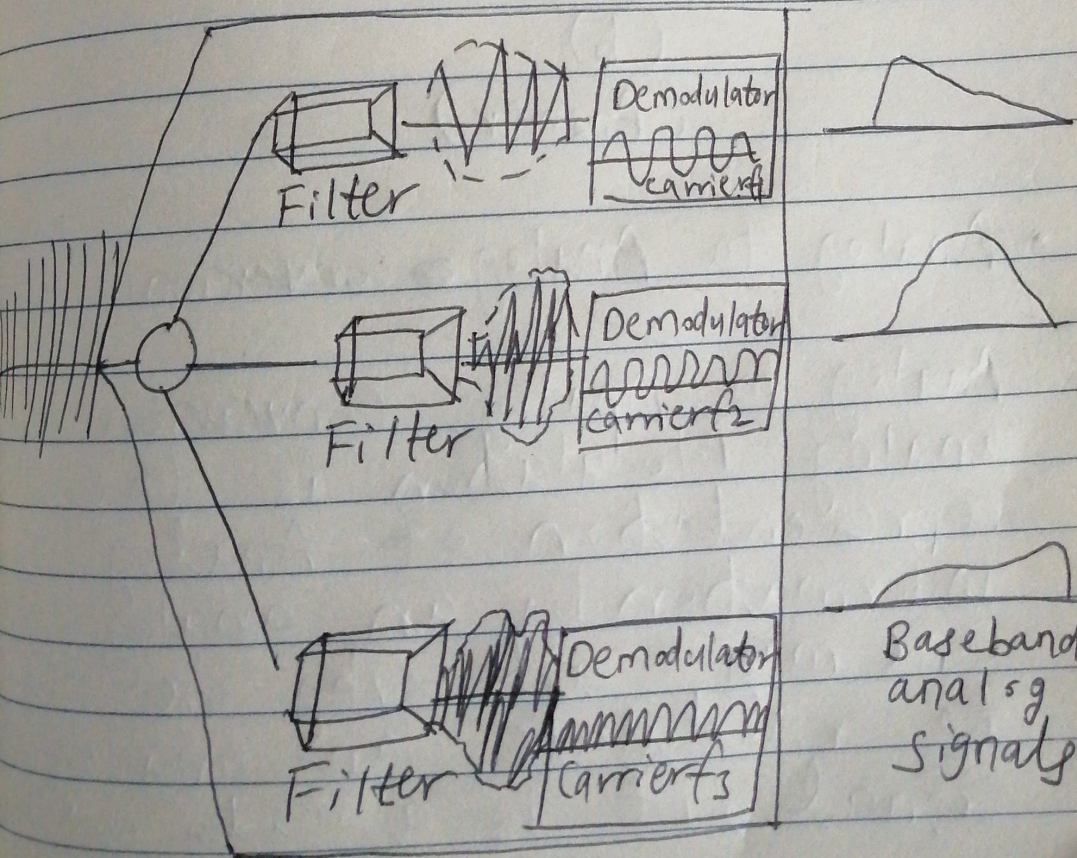
Date: / /

Syed Danish Ali 14712

which apart it from carriers and passes them to output lines.



FDM Diagram



Date: / /

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TDM	FDM.
1) It is a digital technique	It is an analog technique
2) Synchorinization pulse is important	Guard band is required.
3) Share high band width	Share a portion of the bandwidth.

(Q.4)
(b)
(Answer).

- Analog to Analog conversion:-

Analog to Analog Conversion or analog Modulation is the representation of Analog information by an analog signal. One may ask why we need to modulate an analog signal, it is already analog

Date: / /

Syed Danish Ali 14712.

Modulation is needed if the medium is band-pass in nature or if any a band-pass channel is available to us. An example is ratio. The government assign a narrow bandwidth to each radio station. The analog signal produced by each station is low-pass signal and in the same range.

To be able L. Ten to different station the low-pass signal need to be shifted each a different range.

Analog-to Analog conversion can be accomplished in three ways.

1) Amplitude Modulation (AM)
2) Frequency Modulation (FM)
3) Phase Modulation (PM).