Kafrelsheikh University
Faculty of Engineering
Department of Electrical Engineering
Subject: Communication Systems

Time allowed: 3 Hours
Full mark: 85 Marks
Academic year: 2020-2021
Year: 3rd year

Solve the following questions:-

Question One: (20 Marks)

Put (√) or (×) then correct the false one:
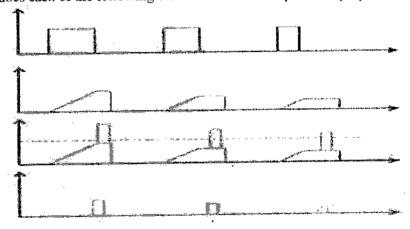
1- In continuous wave modulation some parameters (amplitude, duration, position) of a carrier wave is varied continuously in accordance with the message signal.
2- Line coding is the process for converting digital signal into digital data.
3- It is considered a perfect sampling which used to modulate a massage signal of frequency = 1kHz by PAM system using a pulse generator of sample time =0.25 ms and the number of samples per cycle =2 samples.
4- Internet of Things is an emerging technology refers to a wireless network between objects at a certain time only.
5- The companding process is a combination of expanding at transmitter and compressing at receiver.
6- In nonuniform quantization we need to vary the step size's' according to the signal level to keep the bit rate high.
7- In synchronous transmission, we send one start bit (0) at the beginning and one or more stop bits (1s) at the end of each byte.
8- If ANN used in classification applications the number of nodes in the input layer equal the number of classes.
9- When you deal with data in advanced communication systems based on machine learning, you must keep in mind that the training set and test set are disjoint.
10- If you are trying to predict the weather, you should randomly your data before splitting it.

Question Two: (20 marks)

Choose the correct answer:

1- In the counting encoder circuit used for ADC, when the value of the ramp becomes …………..the sample value, the binary value of the counter is read.
(a) Greater than   (b) Equal to   (c) Less than

2- The counting encoder circuit used for ADC, requires only a few component but the speed of this type is limited by the speed of the ………………
(a) Comparator   (b) Counter   (c) Input signal

3- There are three main techniques used to implement the analog to digital converter, …………. is considered the fast technique but requires more hardware than the other two methods.
(a) Counting Encoder   (b) Parallel Encoder   (c) Serial Encoder

4- Non uniform quantization is practically achieved through a process called ………………
(a) Expanding   (b) Companding   (c) Compression

5- The case of uniform quantization corresponds to a value of A =………. In A- law companding.
(a) 0   (b) 1   (c) 2

6- Mathematically we can consider .... sampled signal is equivalent to the convolved sequence of the pulse train and the ideal impulse sampled signal.
(a) Natural   (b) Flat top   (c) Impulse

7- The input to machine learning is ....
(a) Data and answers   (b) Data and rules   (c) Answers and rules

8- The bandwidth of PCM depends on ....
(a) Bit rate   (b) Pulse shape   (c) Both of them

9- .... in the IoT refers to the ability to extract knowledge smartly by different machines to provide the required services.

(a) Semantics   (b) Communication   (c) Computation

10- In .... transmission, we send bits one after another without start / stop bits or gaps.
(a) Synchronous   (b) Asynchronous   (c) Both of them

Question Three: (25 Marks)

1- Assume that an analog voice frequency signal, which occupies a band from 300 to 3400 HZ, is to be transmitted over a $\mu=255$ law companded PCM system. Assume that each sample value is represented by 7 information bits plus 1 parity bit. Find the following:
    a)   Number of levels used in quantizer.
    b)   Bit rate.
    c)   Assume a code word of transmitted data in a certain time is 00011011 represent the digital signal using **Manchester Signaling.**
    d)   Bandwidth using this line code
    e)   The output SNR for this companded PCM system

2- What does each of the following waveforms mean? Explain the purpose of their sequence.

3- Draw the block diagram of the Pulse Amplitude Modulator and Demodulator systems.