

KATHMANDU UNIVERSITY  
End Semester Examination  
February/March, 2018

Marks Scored:

Level : B.E.

Year : III

Course : ETEG 302

Semester : I

Exam Roll No.:

Time: 30 mins.

F.M. : 10

Registration No.:

Date

MAR 13 2018

SECTION "A"

[20Q.×0.5=10]

Choose the most appropriate option.

- A signal termed as "Energy Signal" has energy and power relation as follows:
  - Finite Energy and Infinite Power
  - Finite Energy and Zero Power
  - Infinite Energy and Finite Power
  - Infinite Energy and Infinite Power
- A continuous periodic signal can be represented into frequency domain by using the following mathematical tool:
  - Fourier Series
  - Fourier Transform
  - Fast Fourier Transform
  - Inverse Fourier Transform
- In the frequency domain, all the components (frequency and amplitude) of a sine wave can be represented by
  - A single vertical line
  - Two vertical lines opposite to each other
  - Multiple vertical lines
  - Infinite vertical lines
- The coaxial cable appears less susceptible to noise mainly because of the role of
  - Copper wire
  - Plastic jacket
  - Inner conductor
  - Outer conductor
- In AM, over-modulation occurs when
  - Signal amplitude is less than carrier amplitude
  - Signal amplitude is equal to the carrier amplitude
  - Signal amplitude is greater than the carrier amplitude
  - Signal amplitude is absent
- If the signal with 57 kHz bandwidth is amplitude modulated and the lowest frequency of modulated signal is 157 kHz, the highest frequency is
  - 100 kHz
  - 157 kHz
  - 214 kHz
  - 271 kHz
- In DSB-SC AM, if the signal power is 5 Watt, the power content of the carrier will be
  - 0 Watt
  - 2.5 Watt
  - 5 Watt
  - 10 Watt
- In any modulated signal, if  $A_{\min}=1.4$  and  $A_{\max}=2.1$ , then MI equals to
  - 20 %
  - 66 %
  - 100%
  - 150%
- Amplitude modulation of binary pulse is referred to as
  - ASK
  - PSK
  - FSK
  - BPSK

10. If carrier frequency is at 1000 kHz and IF is at 910 kHz, the image frequency will be at
  - a. 90 kHz
  - b. 1000 kHz
  - c. 1910 kHz
  - d. 2820 kHz
11. The maximum modulation index in AM such that envelop detection can be used for demodulation is
  - a. 0.33
  - b. 0.5
  - c. 0.66
  - d. 1
12. According to Carson's rule, signal with 75 kHz peak deviation, and a maximum audio frequency of 15 kHz, would require an approximate bandwidth of
  - a. 75 kHz
  - b. 90 kHz
  - c. 165 kHz
  - d. 180 kHz
13. In FM stereo broadcasting system, ..... kHz subcarrier is used to modulate the difference signal.
  - a. 19 kHz
  - b. 38 kHz
  - c. 23 kHz
  - d. 53 kHz
14. If local radio station broadcasting in 96.1 MHz is frequency modulated by 15 kHz sound wave with modulation index of 50, the frequency deviation in that case equals to
  - a. 15 kHz
  - b. 30 kHz
  - c. 750 kHz
  - d. 1441.5 kHz
15. If the frequency of modulated wave is less than frequency of the carrier wave, then input signal is
  - a. Negative
  - b. Positive
  - c. Zero
  - d. Infinite
16. If the frequency of the message signal is increased, the carrier frequency deviation of the FM signal
  - a. Increases
  - b. Decreases
  - c. Remains constant
  - d. Increases and decreases
17. In 1941, US government and industry agreed that TV would present black and white pictures with
  - a. 525 lines at speed of 25 frames per second
  - b. 525 lines at speed of 30 frames per second
  - c. 625 lines with speed of 25 frames per second
  - d. 625 lines at speed of 30 frames per second
18. At the beginning of CATV in 1950s it used to stand for
  - a. Community Analog Television
  - b. Community Artist's Television
  - c. Community Antenna Television
  - d. Cable Assisted Television
19. The positioning of electron beams from one scanline to another scanline is known as
  - a. Horizontal Fly-Back
  - b. Horizontal retrace
  - c. Raster scanning
  - d. Refreshing
20. For the TV channel 39 that extends from 620 to 626 MHz, the sound carrier lies at
  - a. 625.75
  - b. 625.25
  - c. 621.25
  - d. 621.75

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Level : B.E.  
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Time : 2 hrs. 30 mins.

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Semester: I  
F.M. : 40

SECTION "B"

*Attempt any FOUR questions. Each question carries 10 marks. Symbols have their usual meanings. Urgent appropriate assumptions are permissible. Marks are indicated inside brackets.*

**Question No. 1**

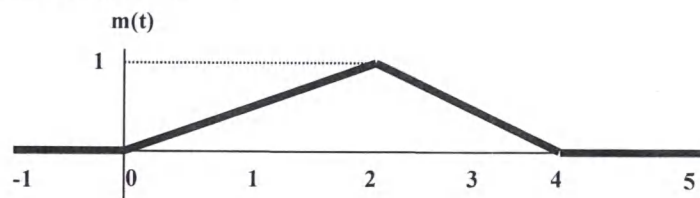
- 1.1 What is guided and unguided communication? Discuss the problems associated with unguided communication in comparison to guided communication with example. [2+3=5]
- 1.2 Relate attenuation in communication channel with distortion. Explain why digital communication is better than its analog counterpart. [2+3=5]

**Question No.2**

- 2.1 What is modulation? Explain how modulation helps in reducing the size of an antenna in wireless communication. With help of an example, discuss the advantages of the modulation in terms of antenna size reduction. [1+2+2=5]
- 2.2 Sketch and compare SSB-SC with that of QAM. Write difference between coherent and non-coherent demodulation with its pros and cons. [3+2=5]

**Question No.3**

- 3.1 Compare NBFM with WBFM. For the signal below sketch the FM wave assuming the carrier wave of your own. [3+2=5]



- 3.2 Explain the role of preemphasis and deemphasis filters in the FM broadcasting system. What do you understand by the term Superhetrodyne, explain the process in brief with example. [1+2+2=5]

**Question No.4**

- 4.1 What do you mean by noise? List different sources of noise in communication channel with example. Also, write briefly on AWGN. [1+2+2=5]
- 4.2 Show that SNR in NBFM is equivalent to AM. [5]

**Question No.5**

- 5.1 Summarize the working principle of color TV broadcasting system from the stage of video generation to display. [3+2=5]
- 5.2 Suppose in a TV set there is written 1080i/p, write how you will interpret the information. If the color TV signal is present in the channel, draw its spectrum. [3+2=5]