

KATHMANDU UNIVERSITY  
End Semester Examination  
March/April 2017

Marks Scored:

Level : B.E.  
Year : III

Course : ETEG 302  
Semester: I

Exam Roll No. :

Time : 30 minss.

F.M. : 10

Registration No.:

Date : APR 09 2017

SECTION "A"  
[20 Q.×0.5=10]

Choose the most appropriate option.

1. We send a voice signal from a microphone to a recorder, transmission is
  - a. Broadband transmission
  - b. Broadcast transmission
  - c. Baseband transmission
  - d. Carrier wave transmission
2. The amount of information carried by continuous time signal can be considered as
  - a. Zero
  - b. 2 bits
  - c. L bits ( $0 \leq L \leq 16$ )
  - d. Infinite
3. Vestigial side band AM is mostly used in
  - a. Radio transmission
  - b. TV transmission
  - c. Cellular mobile communication
  - d. Wireless Fidelity
4. Pre-emphasis is used in FM transmitter to
  - a. Improve SNR of high modulating frequencies
  - b. Improve SNR of low modulating frequencies
  - c. Improve SNR of carrier signal
  - d. Improve SNR of modulating signal
5. If the signal bandwidth of the signal is 57 kHz and the lowest frequency is 157 kHz, the highest frequency is
  - a. 100kHz
  - b. 157 kHz
  - c. 214 kHz
  - d. 271 kHz
6. If the signal losses its strength due to the resistance of the transmission medium, it's called
  - a. Attenuation
  - b. Distortion
  - c. Noise
  - d. Fading
7. Over modulation refers the case when
  - a. Signal amplitude is equal to the carrier amplitude
  - b. Signal amplitude is less than carrier amplitude
  - c. Signal amplitude is greater than carrier amplitude
  - d. Signal amplitude is half the carrier amplitude
8. In any modulated signal, if  $A_{\min}=40$  and  $A_{\max}=60$ , MI equals to
  - a. 10%
  - b. 20 %
  - c. 40%
  - d. 60 %
9. A Carrier wave of peak value of 16 V is used to transmit a message signal of 1MHz. If the selected modulation index value is 60%, what should be the peak value of modulating signal if AM is used?
  - a. 0.0375 V
  - b. 0.9277 V
  - c. 9.6 V
  - d. 26.66 V

10. If DSB-SC modulation scheme is adopted to modulate the carrier signal of 1.2 MHz by message signal of 2 kHz frequency, the frequencies present in the modulated signal would be
  - a. 1.2 MHz and 1.4 MHz
  - b. 1.198 MHz, 1.2 MHz, and 1.202 MHz
  - c. 1 MHz, 1.2 MHz, and 1.4 MHz
  - d. 1.2 MHz and 1.202 MHz
11. According to Carson's rule, signal with 5 kHz peak deviation, and a maximum audio frequency of 3 kHz, would require an approximate bandwidth of
  - a. 8 kHz
  - b. 11 kHz
  - c. 13 kHz
  - d. 16 kHz
12. Transmission of pure FM signal requires bandwidth
  - a. Twice the BW of message signal
  - b. Twice the BW of message signal plus modulating frequency
  - c. Twice modulating frequency
  - d. Infinite
13. For effective modulation, the degree of modulation should
  - a. Be small
  - b. Be large
  - c. Never exceed 100%
  - d. Always more than 100 %
14. In TV, an electrical disturbance will result into
  - a. Affected audio and video signals
  - b. Affected audio signal only
  - c. Affected video signal only
  - d. No affection at both audio and video signals
15. In AM super-hetrodyne receiver, if the radio wave is of 850 kHz frequency, then the frequency of local oscillator will be
  - a. 1305 kHz
  - b. 850 kHz
  - c. 1000 kHz
  - d. 500 kHz
16. In color TV, ..... is used to make each kind of phosphor only visible from one gun.
  - a. Color mask
  - b. Shadow mask
  - c. Phosphor mask
  - d. RGB mask
17. Of the following, signal ..... is not transmitted in the color TV system.
  - a. Y
  - b. Q
  - c. R
  - d. I
18. Cable Television is an example of
  - a. TDMA
  - b. CDMA
  - c. FDMA
  - d. SDMA
19. Equalizing pulses in TV sets are sent during
  - a. Horizontal blanking
  - b. Vertical blanking
  - c. Before color burst
  - d. After color burst
20. Approximate bandwidth occupied by the chrominance video signal for color TV is equal to
  - a. 0.8 MHz
  - b. 1.8 MHz
  - c. 1.25 MHz
  - d. 1.6 MHz

KATHMANDU UNIVERSITY  
End Semester Examination  
March/April 2017

APR 09 2017  
Course : ETEG 302  
Semester: I  
F.M. : 40

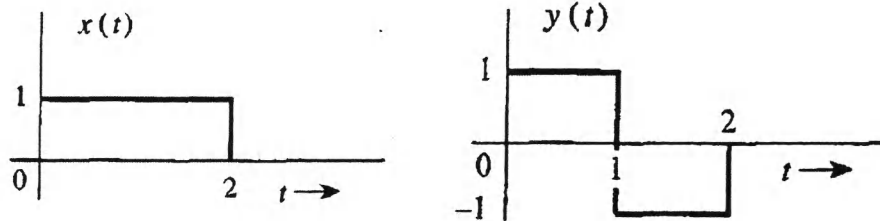
Level : B.E.  
Year : III  
Time : 2 hrs. 30 mins.

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 For the signals  $x(t)$  and  $y(t)$  below, find  $E_x$  and  $E_y$  (energy of the signals). Sketch the signals  $x(t) + y(t)$  and  $x(t) - y(t)$  and show that energies of either of these two signals are equal to  $E_x + E_y$ . [2+3=5]



- 1.2 What is Fourier transform and why do we need it in the field of signal processing? Write any four properties of Fourier transform. Find the Fourier transform of the unit impulse signal  $\delta(t)$  and then sketch. [1+2+2=5]

**Question No.2**

- 2.1 What is modulation? Write any four significant advantage of modulation in field of communication. Write pros and cons of AM and FM. [1+2+2=5]
- 2.2 Sketch and compare SSB-SC with that of VSB AM. Determine  $\eta$  and the percentage of the total power carried by the sidebands of the AM wave for tone modulation when  $\mu = 0.5$  and  $\mu = 0.3$ . [3+2=5]

**Question No.3**

- 3.1 With the aid of diagram, explain briefly the basic principle of FM. Arrange the following modulated signals in terms of the bandwidth they require (from higher to lower) and mention how much bandwidth they require, if modulating signal bandwidth is assumed to be **B**. The signals of our interest are: (i) DSB-SC, (ii) SSB-SC, (iii) AM, (iv) VSB, (v) NBFM, and (vi) WBFM. [2+3=5]
- 3.2 Explain the role of preemphasis and deemphasis filters in the FM broadcasting system. [5]

**Question No.4**

- 4.1 Define (i) Pre-detection SNR, (ii) Post-detection SNR, and (iii) Reference SNR. Write briefly on AWGN. [3+2=5]
- 4.2 Show that SNR in AM is worse than that of DSB-SC. [5]

**Question No.5**

- 5.1 Compare CRT with LED and PLASMA display units. Write working principle of color CRT monitor. [3+2=5]
- 5.2 Describe how color TV signal (picture and audio) is transmitted in color TV broadcasting system with its block diagram. If the color TV signal is present in the channel, draw its spectrum. [3+2=5]