SRI SAIRAM ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SAMPLE QUESTIONS FOR TEACHING LEARNING PROCESS

Domain: **COMMUNICATION THEORY**

1) In Pulse Position Modulation, the drawbacks are

a. Synchronization is required between transmitter and receiver

b. Large bandwidth is required as compared to PAM

c. None of the above

d. Both a and b

2) In PWM signal reception, the Schmitt trigger circuit is used

a. To remove noise

b. To produce ramp signal

c. For synchronization

d. None of the above

3) In pulse width modulation,

a. Synchronization is not required between transmitter and receiver

b. Amplitude of the carrier pulse is varied

c. Instantaneous power at the transmitter is constant

d. None of the above

4) In different types of Pulse Width Modulation,

a. Leading edge of the pulse is kept constant

b. Tail edge of the pulse is kept constant

c. Centre of the pulse is kept constant

d. All of the above

5) In Pulse time modulation (PTM),

a. Amplitude of the carrier is constant

b. Position or width of the carrier varies with modulating signal

c. Pulse width modulation and pulse position modulation are the types of PTM

d. All of the above

6) Drawback of using PAM method is

a. Bandwidth is very large as compared to modulating signal

b. Varying amplitude of carrier varies the peak power required for transmission

c. Due to varying amplitude of carrier, it is difficult to remove noise at receiver

d. All of the above

7) Pulse time modulation (PTM) includes

a. Pulse width modulation

b. Pulse position modulation

c. Pulse amplitude modulation

d. Both a and b

8) In pulse amplitude modulation,

a. Amplitude of the pulse train is varied

b. Width of the pulse train is varied

c. Frequency of the pulse train is varied

d. None of the above

9) Types of analog pulse modulation systems are

a. Pulse amplitude modulation

b. Pulse time modulation

c. Frequency modulation

d. Both a and b

10) The sampling technique having the minimum noise interference is

a. Instantaneous sampling

b. Natural sampling

c. Flat top sampling

d. All of the above

11) The instantaneous sampling

a. Has a train of impulses

b. Has the pulse width approaching zero value

c. Has the negligible power content

d. All of the above

12) The techniques used for sampling are

a. Instantaneous sampling

b. Natural sampling

c. Flat top sampling

d. All of the above

13) A low pass filter is

a. Passes the frequencies lower than the specified cut off frequency

b. Rejects higher frequencies

c. Is used to recover signal from sampled signal

d. All of the above

14) Calculate the Nyquist rate for sampling when a continuous time signal is given by

$x(t) = 5 \cos 100\pi t + 10 \cos 200\pi t - 15 \cos 300\pi t$

a. 300Hz

b. 600Hz

c. 150Hz

d. 200Hz

15) Calculate the minimum sampling rate to avoid aliasing when a continuous time signal is given by $x(t) = 5 \cos 400\pi t$

a. 100 Hz

b. 200 Hz

c. 400 Hz

d. 250 Hz

16) A distorted signal of frequency fm is recovered from a sampled signal if the sampling frequency fs is

a. $fs > 2fm$

b. $fs < 2fm$

c. $fs = 2fm$

d. $fs \geq 2fm$

17) The desired signal of maximum frequency wm centered at frequency w=0 may be recovered if

a. The sampled signal is passed through low pass filter

b. Filter has the cut off frequency wm

c. Both a and b

d. None of the above

18) The spectrum of the sampled signal may be obtained without overlapping only if

a. $fs \geq 2fm$

b. $fs < 2fm$

c. $fs > fm$

d. $fs < fm$

19) The rms value of thermal noise voltage is related to Boltzmann's constant k as

a. Vn is Directly proportional to k2

b. Vn is Directly proportional to k

c. Vn is Directly proportional to √k

d. Vn is Directly proportional to k3

20) Threshold effect is:

a. Reduction in output signal to noise ratio

b. Large noise as compared to input signal to envelope detector

c. Detection of message signal is difficult

d. All of the above

21) Thermal noise is also known as

a. Johnson noise

b. Partition noise

c. Flicker noise

d. Solar noise

22) For a Unit ramp function area of pulse curve is unity

a. Discontinuous at time t=0

b. Starts at time t=0 and linearly increases with t

c. Both a and b

d. None of the above

23) In Unit impulse function

a. Pulse width is zero

b. Area of pulse curve is unity

c. Height of pulse goes to infinity

d. All of the above

24) Unit step function is

a. Exists only for positive side

b. Is zero for negative side

c. Discontinuous at time t=0

d. All of the above

25) Random signals is

a. May be specified in time

b. Occurrence is random

c. Repeat over a period

d. None of the above

26) An even function f(x) for all values of x and x holds

a. $f(x) = f(-x)$

b. $f(x) = -f(x)$

c. $f(x) = f(x)f(-x)$

d. None of the above

27) Properties of Hilbert transform are:

a. The signal and its Hilbert transform have same energy density spectrum

b. The signal and its Hilbert transform are mutually diagonal

c. Both a and b are correct

d. None of the above

28) Sine wave is a

a. Periodic signal

b. Aperiodic signal

c. Deterministic signal

d. Both a and c

29) A periodic signal is

a. May be represented by $g(t) = g(t + T0)$

b. Value may be determined at any point

c. Repeats itself at regular intervals

d. All of the above

30) At a room temperature of 300K, calculate the thermal noise generated by two resistors of 10KΩ and 30 KΩ when the bandwidth is 10 KHz and the resistors are connected in parallel.

a. $30.15 * 10^{-3}$

b. $8.23 * 10^{-23}$

c. $11.15 * 10^{-7}$

d. $26.85 * 10^{-7}$

31) At a room temperature of 293K, calculate the thermal noise generated by two resistors of 20KΩ and 30 KΩ when the bandwidth is 10 KHz and the resistors are connected in series.

a. $300.66 * 10^{-7}$

b. $284.48 * 10^{-7}$

c. $684.51 * 10^{-15}$

d. $106.22 * 10^{-7}$

32) At a room temperature of 300K, calculate the thermal noise generated by two resistors of 10KΩ and 20 KΩ when the bandwidth is 10 KHz.

a. $4.071 * 10^{-6}$ V V, $5.757 * 10^{-6}$ V

b. $6.08 * 10^{-6}$ V V, $15.77 * 10^{-6}$ V

c. $16.66 * 10^{-6}$ V V, $2.356 * 10^{-6}$ V

d. $1.66 * 10^{-6}$ V V, $0.23 * 10^{-6}$ V

33) Hilbert transform may be used in

a. Generation of SSB signals

b. Representation of band pass signals

c. Designing of minimum phase type filters

d. All of the above

34) Low frequency noise is

a. Transit time noise

b. Flicker noise

c. Shot noise

d. None of the above

35) Noise power at the resistor is affected by the value of the resistor as

a. Directly proportional to the value of the resistor

b. Inversely proportional to the value of the resistor

c. Unaffected by the value of the resistor

d. Becomes half as the resistance value is doubled

36) Noise is added to a signal in a communication system

a. At the receiving end

b. At transmitting antenna

c. In the channel

d. During regeneration of the information

37) Notch filter is a

a. Band pass filter

b. Band stop filter

c. Low pass filter

d. High pass filter

38) Noise voltage Vn and absolute temperature T are related as

a. $Vn = 1/ \sqrt{(4RKTB)}$

b. $Vn = \sqrt{(4RK)}/ (TB)$

c. $Vn = \sqrt{(4RKTB)}$

d. $Vn = \sqrt{(4KTB)}/R$

39) The noise temperature at a resistor depends upon

a. Resistance value

b. Noise power

c. Both a and b

d. None of the above

40) For a two stage amplifier, first amplifier has Voltage gain = 20, Input Resistance Rin1=700Ω, equivalent Resistance Req1=1800Ω and Output Resistor Ro1 = 30KΩ. The corresponding values of second amplifier are : 25, 80 KΩ, 12 KΩ, 1.2 MΩ respectively. What is the value of equivalent input noise resistance of the given two stage amplifier?

a. 2609.1Ω

b. 2607.1Ω

c. 107.1Ω

d. 2107.1Ω

41) The Noise Factor for cascaded amplifiers (FN) is given by (F1, F2, F3 .. FN, G1, G2, G3....GN) are the noise factors and the gains of the amplifiers at different stages:

a. FN = F1 + F2/ G1 + F3/ G1G2+ ..+ FN/ G1G2G3GN

b. FN = F1 + (F2 - 1)/ G1 + (F3 - 1)/ (G1+G2)+ ..+(FN - 1)/ (G1+G2+G3+...+GN)

c. FN = F1 + F2/ G1 + F3/ (G1+G2) +...+ FN/ (G1+G2+G3+...+GN)

d. FN = F1 + (F2 - 1)/ G1 + (F3 - 1)/ G1G2+...+(FN - 1)/ G1G2G3GN

42) Noise Factor(F) and Noise Figure(NF) are related as

a. NF = 10 log10(F)

b. F = 10 log10(NF)

c. NF = 10 (F)

d. F = 10 (NF)

43) Noise factor for a system is defined as the ratio of

a. Input noise power (Pno) to output noise power (Pni)

b. Output noise power (Pno) to input noise power (Pni)

c. Output noise power (Pno) to input signal power (Psi)

d. Output signal power (Pso) to input noise power (Pni)

44) The noise voltage (Vn) and the signal bandwidth (B) are related as

a. Vn is directly proportional to bandwidth

b. Vn is directly proportional to √bandwidth

c. Vn is inversely proportional to absolute temperature

d. Vn is inversely proportional to bandwidth

45) In Hilbert transform of a signal, the phase angles of all components of a given signal are shifted by

a. +/- π

b. +/- $\pi/4$

c. +/- $\pi/2$

d. Any angle from 00 to 3600

46) Signum function sgn(f), for f>0, f=0 and f<0, has the values:

a. -1 to +1

b. +1, 0, -1 respectively

c. $-\infty$ to $+\infty$

d. 0 always

47) Figure of merit γ is

a. Ratio of output signal to noise ratio to input signal to noise ratio

b. Ratio of input signal to noise ratio to output signal to noise ratio

c. Ratio of output signal to input signal to a system

d. Ratio of input signal to output signal to a system

48) Transit time noise is

a. Low frequency noise

b. High frequency noise

c. Due to random behavior of carrier charges

d. Due to increase in reverse current in the device

49) The noise due to random behaviour of charge carriers is

a. Shot noise

b. Partition noise

c. Industrial noise

d. Flicker noise

50) The Hilbert transform of the signal $\sin\omega_1 t + \sin\omega_2 t$ is

a. $\sin\omega_1 t + \sin\omega_2 t$

b. $\cos\omega_1 t + \cos\omega_2 t$

c. $\sin\omega_2 t + \cos\omega_2 t$

d. $\sin\omega_1 t + \sin\omega_1 t$