MultipleType Questions (MCQs)
Subject: DSP
Prepared by: Mrs. PrabhatiSethy

1.The product of two odd signals is:

a. Odd
b. Even
c. Both (a) and (b)
d. Zero

2. Which of the following is the characteristic of the power signal?

a. Power signal is infinite.
b. Power signals are time-limited.
c. Aperiodic signals are power signals.
d. None of the above

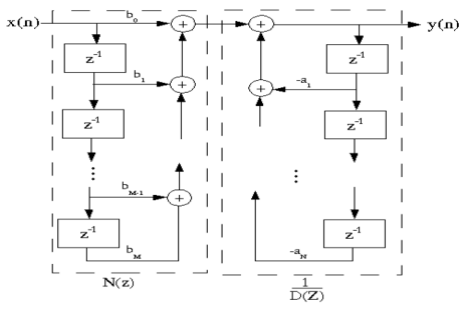
3. How many memory locations are used for storage of the output point of a sequence of length M in direct form realization?

a. M+1
b. M
c. M-1
d. none of the mentioned

4. What is the general system function of an FIR system?

a. ΣM−1k=0bkx(n−k)
b. ΣMk=0bkz−k
c. ΣM−1k=0bkz−k
d. None of the mentioned

5. Which of the following filters have a cascade realization as shown below?



a. IIR filter
b. Comb filter
c. High pass filter
d. FIR filter

6. The discrete time function defined as u(n)=n for n≥0;u(n)=0 for n

a. Unit ramp signal

b. Unit step signal

c. Unit sample signal

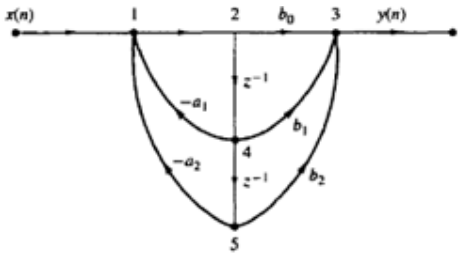
d. none of the above

7. If x[n]={1,2,3,4} and X(k) is its DFT then X(0) will be
a. 2-2j
b. **10**
c. 2+2j
d. -2

8. A real valued signal x(n) is called as anti-symmetric if _____
a) x(n)=x(-n)
b) x(n)=-x(-n)
c) x(n)=-x(n)
d) none of the mentioned

9.If the output of the system of the system at any 'n' depends only the present or the past values of the inputs then the system is said to be _____
a) Linear
b) Non-Linear
c) Causal
d) Non-causal

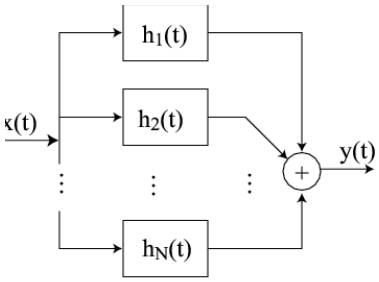
10. Which of the following is true for the given signal flow graph?



a) Two pole system
b) Two zero system
c) **Two pole and two zero system**

d) None of the mentioned

11. **The structure shown below is known as _____**



a) **Parallel form structure**
b) Cascade structure
c) Direct form
d) None of the mentioned

12. The interface between an analog signal and a digital processor is

a. D/A converter
b. A/D converter
c. Modulator
d. Demodulator

13. The speech signal is obtained after

a. Analog to digital conversion
b. Digital to analog conversion
c. Modulation
d. Quantization

14. Telegraph signals are examples of

a. Digital signals
b. Analogsignals
c. Impulse signals
d. Pulse train

15. As compared to the analog systems, the digital processing of signals allow

1) Programmable operations
2) Flexibility in the system design
3) Cheaper systems
4) More reliability

a. 1, 2 and 3 are correct
b. 1 and 2 are correct

c. 1, 2 and 4 are correct
d. All the four are correct

16. The discrete impulse function is defined by

a. $\delta(n) = 1, n \geq 0 = 0, n \neq 1$
b. $\delta(n) = 1, n = 0 = 0, n \neq 1$
c. $\delta(n) = 1, n \leq 0 = 0, n \neq 1$
d. $\delta(n) = 1, n \leq 0 = 0, n \geq 1$

17. DTFT is the representation of

a. Periodic Discrete time signals
b. Aperiodic Discrete time signals
c. Aperiodic continuous signals
d. Periodic continuous signals

18. Frequency selectivity characteristics of DFT refers to

a**. Ability to resolve different frequency components from input signal**
b. Ability to translate into frequency domain
c. Ability to convert into discrete signal
d. None of the above

19. FFT may be used to calculate
1) DFT
2) IDFT
3) Direct Z transform
4) In direct Z transform

a. 1, 2 and 3 are correct
b. **1 and 2 are correct**
c. 1 and 3 are correct
d. All the four are correct

20. The s plane and z plane are related as

a. $z = esT$
b. $z = e^{2sT}$
c. $z = 2e^{sT}$
d. $z = e^{sT}/2$

21. The several ways to perform an inverse Z transform are

1) Direct computation
2) Long division
3) Partial fraction expansion with table lookup
4) Direct inversion

a. 1, 2 and 3 are correct
b. 1 and 2 are correct
c. 2 and 3 are correct
d. **All the four are correct**

22.The system described by the input-output equation $y(n)=nx(n)+bx^3(n)$ is a _____
a) Static system
b) Dynamic system
c) Identical system
d) None of the mentioned
23If a system do not have a bounded output for bounded input, then the system is said to be _____
a) Causal
b) Non-causal
c) Stable
d) Non-stable
24.The block denoted as follows is known as _____

a) Delay block
b) Advance block
c) Multiplier block
d) Adder block

25. Which of the following relation is true?
a) $r_{xy}(l)= r_{xy}(-l)$
b) $r_{xy}(l)= r_{yx}(l)$
c) $r_{xy}(l)= r_{yx}(-l)$
d) none of the mentioned
26.What is the set of all values of z for which X(z) attains a finite value?
a) Radius of convergence
b) Radius of divergence
c) Feasible solution
d) None of the mentioned

27. A discrete time signal may be
1) Samples of a continuous signal
2) A time series which is a domain of integers
3) Time series of sequence of quantities
4) Amplitude modulated wave

a. 1, 2 and 3 are correct
b. 1 and 2 are correct
c. 1 and 3 are correct

d. All the four are correct

28. Frequency selectivity characteristics of DFT refers to

a. Ability to resolve different frequency components from input signal
b. Ability to translate into frequency domain
c. Ability to convert into discrete signal
d. None of the above

29. Which of the following is done to convert a continuous time signal into discrete time signal?

a) Modulating
b) Sampling
c) Differentiating
d) Integrating

30. The even part of a signal x(t) is**?**

a) x(t)+x(-t)
b) x(t)-x(-t)
c) (1/2)*(x(t)+x(-t))
d) (1/2)*(x(t)-x(-t))

31. For a continuous time signal x(t) to be periodic with a period T, then x(t+mT) should be equal to _____

a) x(-t)
b) x(mT)
c) x(mt)
d) x(t)

32. x(t) or x(n) is defined to be an energy signal, if and only if the total energy content ofthe signal is a _____

a) Finitequantity
b) Infinite
c) Zero
d) None of the mentioned

33. What is the z-transform of the following finite duration signal?
x(n)={2,4,5,7,0,1}?
↑

a) 2 + 4z + 5z2 + 7z3 + z4
b) 2 + 4z + 5z2 + 7z3 + z5
c) 2 + 4z-1 + 5z-2 + 7z-3 + z-5
d) 2z2 + 4z + 5 +7z-1 + z-3 L3 4.

34. Which of the following is common independent variable for speech signal, EEG and ECG?

a) Time
b) Spatial coordinates
c) Pressure
d) None of the mentioned

35. Which of the following conditions made digital signal processing more advantageous over analog signal processing?
a) Flexibility
b) Accuracy
c) Storage
d) All of the mentioned

36.The system described by the equation y(n)=ay(n-1)+b x(n) is a recursive system.
a) True
b) False

37. An FIR system is also called as "recursive system".
a) True b) False
38. The system described by the equation y(n)=ay(n+1)+b x(n) is a recursive system.
a) True **b) False**
39. If the system is initially relaxed at time n=0 and memory equals to zero, then the response of such state is called as:
a) Zero-state response
b) Zero-input response
c) Zero-condition response
d) None of the mentioned
40. Zero-state response is also known as:
a) Free response
b) Forced response
c) Natural response
d) None of the mentioned
41. Zero-input response is also known as Natural or Free response.
a) True b) False

42. What is the ROC of the signal x(n)=δ(n-k), k>0?
a) z=0
b) z=∞
c) Entire z-plane, except at z=0
d) Entire z-plane, except at z=∞

43. What is the ROC of a causal infinite length sequence?
a) |z|<r1
b) |z|>r1

44. X(z) is the z-transform of the signal x(n), then what is the z-transform of the signal nx(n)?
a) −zdX(z)/dz
b) zdX(z)/dz
c) −z−1dX(z)/dz
d) z−1dX(z)/dz

45.What are the values of z for which the value of X(z)=0?
a) Poles
b) Zeros
c) Solutions
d) None of the mentione

46. One-sided Z-transform is also known as:

a. Unilateral Z-transform
b. Bilateral Z-transform
c. Trilateral Z-transform
d. None of the above

47.The Z-transform of the function y(n) = x(n) + y(n - 1) is:

a. z/ z + 1
b. z/ 2z
c. z/ z - 1
d. z - 1/z

48. The z-transform of the signal a^nx(n) is:

a. X(za)
b. X(z/a)
c. X(z + a/a)
d. None of the above

49. The addition of zeroes at the end of the sequence when it is represented as the power of integer is refer as:

a. Region of Convergence

b. Bilateral transform

c. Zero padding

d. None of the above

50. Which of the following statement is/are correct about linear convolution?

1. The Input and output sequence is Aperiodic.

2. It requires zero padding.

3. The length of the input and output sequence is the same.

4. The length of output sequence is greater than the input sequence.

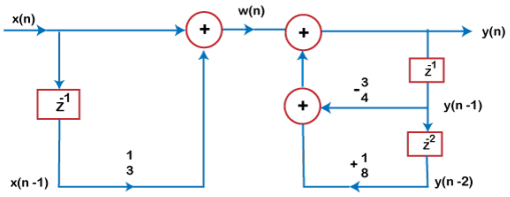
a. Only 1

b. 1 and 2

c. 1 and 4

d. 1, 2, 3, and 4

51. Determine the discrete equation of the direct form-I structure shown in the below figure:



a. 3/4 y(n - 2) - 1/8 y(n - 3) + x(n) + 1/3x(n - 1)

b. 3/4 y(n - 1) - 1/8 y(n - 2) + x(n) + 1/3x(n - 1)

c. 3/4 y(n - 1) - 1/8 y(n - 2) + x(n) + 1/3x(n - 2)

d. 3/4 y(n - 1) - 1/8 y(n - 3) + x(n) + 1/3x(n + 1)

52. Which of the following bus is used in the Digital signal processor?

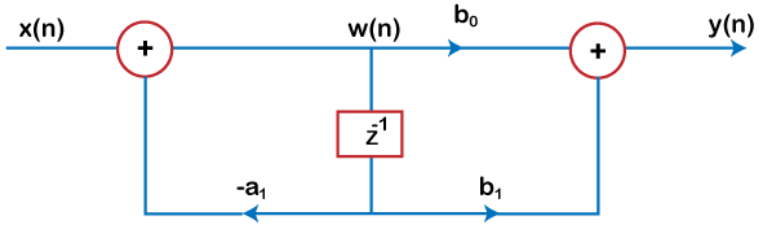
a. Program memory bus

b. Data memory bus

c. Both (a) and (b)

d. None of the above

53. The structure of the direct form- II is shown in the below figure. Determine the order of the system?



a. Second order system

b. First order system

c. Third order system

d. None of the above

54. The Nyquist sampling rate is given by:

a. Fs = 2 Fm

b. Fs = 3 Fm

c. Fs = 4 Fm

d. Fs = Fm

55. Which of the following is/are standard test signals?

a. Step

b. Impulse

c. Exponential

d. All of the above

56.What is the inverse z-transform of $X(z)=11-1.5z-1+0.5z-2$ if ROC is $|z|>1$?

a) $(2-0.5^n)u(n)$

b) $(2+0.5^n)u(n)$

c) $(2^n-0.5^n)u(n)$

d) None of the mentioned

57.What is the convolution of the sequences of x1(n)=x2(n)={1,1,1}?

a) {1,2,3,2,1}

b) {1,2,3,2,1}

c) {1,1,1,1,1}

d) {1,1,1,1,1}

58. What is the period of the Fourier transform $X(\omega)$ of the signal x(n)?

a) π

b) 1

c) Non-periodic

d) 2π

59. Which of the following is true regarding the number of computations requires to compute an N-point DFT?

a) N^2 complex multiplications and N(N-1) complex additions

b) N^2 complex additions and N(N-1) complex multiplications

c) N^2 complex multiplications and N(N+1) complex additions

d) N^2 complex additions and N(N+1) complex multiplications

60.What is the DFT of the four point sequence x(n)={0,1,2,3}?

a) {6,-2+2j-2,-2-2j}

b) {6,-2-2j,2,-2+2j}

c) {6,-2+2j,-2,-2-2j}

d) {6,-2-2j,-2,-2+2j}

61. In Gibb's phenomenon, the ringing effect is predominantly present near the _____ .

a. bandgap

b. bandedge

c. bandwidth

d. bandshell

62.If $W_4^{100}=W_x^{200}$, then what is the value of x?

a) 2 b) 4 **c) 8**d) 16

63.If x(n) and X(k) are an N-point DFT pair, then X(k+N)=?

a) X(-k) b) -X(k)**c) X(k)** d) None of the mentioned

64.In Overlap save method of long sequence filtering, what is the length of the input sequence block?

a) L+M+1 b) L+M**c) L+M-1** d) None of the mentioned

65. Which of the following is the advantage of Hanning window over rectangular window?

a) More side lobes

b) Less side lobes

c) More width of main lobe

d) None of the mentioned

66. If x(n) and X(k) are an N-point DFT pair, then X(k+N)=?

a. X(-k)
b. -X(k)
c. X(k)
d. -X(-k)

67.An analog LTI system with system function H(s) is stable

a. If all its poles lie in the left half of the S Plane
b. If all its zeros lie in the right half of the S Plane
c. If all its poles lie in the right half of the S Plane
d. If all its zeros lie in the left half of the S Plane

68.Which of the following is the disadvantage of Hanning window over rectangular window?
a) More side lobes
b) Less side lobes
c) More width of main lobe
d) None of the mentioned

69.The total number of complex multiplications required to compute N point DFT by radix-2 FFT is?

a) (N/2)log2N

b) Nlog2N

c) (N/2)logN

d) None of the mentioned

70.Which of the following is used in the realization of a system?

a) Delay elements

b) Multipliers

c) Adders

d) All of the mentioned

71. In IIR Filter design by the Bilinear Transformation, the Bilinear Transformation is a mapping from

a) Z-plane to S-plane

b) S-plane to Z-plane

c) S-plane to J-plane

d) J-plane to Z-plane

72.Which of the following is the application of lattice filter?

a) Digital speech processing

b) Adaptive filter

c) Electroencephalogram

d) All of the mentioned

73.If all the poles have small magnitudes, then the rate of decay of signal is _____
a) Slow
b) Constant
c) Rapid
d) None of the mentioned
74.Which of the following method is used to find the inverse z-transform of a signal?
a) Counter integration
b) Expansion into a series of terms
c) Partial fraction expansion
d) All of the mentioned
75. According to Time shifting property of z-transform, if X(z) is the z-transform of x(n) then what is the z-transform of x(n-k)?
a) $z^{k}X(z)$ **b) $z^{-k}X(z)$** c) X(z-k) d) X(z+k)