1) The interface between an analog signal and a digital processor is

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

ANSWER: (b) A/D converter

2) The speech signal is obtained after

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

ANSWER: (b) Digital to analog conversion

3) Telegraph signals are examples of

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

ANSWER: (a) Digital signals

4) 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

ANSWER: (d) All the four are correct

5) The Nyquist theorem for sampling
1) Relates the conditions in time domain and frequency domain
2) Helps in quantization
3) Limits the bandwidth requirement
4) Gives the spectrum of the signal

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

ANSWER: (c) 1 and 3 are correct

6) Roll-off factor is
a. The bandwidth occupied beyond the Nyquist Bandwidth of the filter
b. The performance of the filter or device
c. Aliasing effect
d. None of the above

ANSWER: (a) The bandwidth occupied beyond the Nyquist Bandwidth of the filter

7) 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

ANSWER: (a) 1, 2 and 3 are correct

8) 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. δ(n) = 1, n ≤ 0
= 0, n ≠ 1
d. δ(n) = 1, n ≤ 0
= 0, n ≥ 1

ANSWER: (b) δ(n) = 1, n = 0
= 0, n ≠ 1

9) DTFT is the representation of
a. Periodic Discrete time signals
b. Aperiodic Discrete time signals
c. Aperiodic continuous signals
d. Periodic continuous signals

ANSWER:(b) Aperiodic Discrete time signals

10) The transforming relations performed by DTFT are
1) Linearity
2) Modulation
3) Shifting
4) Convolution

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

ANSWER: (d) All the four are correct

11) The DFT is preferred for
1) Its ability to determine the frequency component of the signal
2) Removal of noise
3) Filter design
4) Quantization of signal

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

ANSWER: (c) 1 and 3 are correct

12) 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

ANSWER: (a) Ability to resolve different frequency components from input signal

13) The Cooley–Tukey algorithm of FFT is a

a. Divide and conquer algorithm
b. Divide and rule algorithm
c. Split and rule algorithm
d. Split and combine algorithm

ANSWER: (a) Divide and conquer algorithm

14) 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

ANSWER: (b) 1 and 2 are correct

15) DIT algorithm divides the sequence into

a. Positive and negative values
b. Even and odd samples
c. Upper higher and lower spectrum
d. Small and large samples

ANSWER: (b) Even and odd samples

16) The computational procedure for Decimation in frequency algorithm takes

a. Log2 N stages
b. 2Log2 N stages
c. Log2 N^2 stages
d. Log2 N/2 stages

ANSWER:(a) Log2 N stages

17) The transformations are required for

1) Analysis in time or frequency domain
2) Quantization
3) Easier operations
4) Modulation

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

ANSWER: (c) 1 and 3 are correct

18) The s plane and z plane are related as

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

ANSWER: (a) $z = e^{sT}$

19) The similarity between the Fourier transform and the z transform is that

a. Both convert frequency spectrum domain to discrete time domain
b. Both convert discrete time domain to frequency spectrum domain
c. Both convert analog signal to digital signal
d. Both convert digital signal to analog signal

ANSWER: (b) Both convert discrete time domain to frequency spectrum domain

20) The ROC of a system is the
a. range of z for which the z transform converges
b. range of frequency for which the z transform exists
c. range of frequency for which the signal gets transmitted
d. range in which the signal is free of noise

ANSWER: (a) range of z for which the z transform converges

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

ANSWER: (d) All the four are correct

22) The anti causal sequences have _____ components in the left hand sequences.
a. Positive
b. Negative
c. Both a and b
d. None of the above

ANSWER: (a) Positive

23) For an expanded power series method, the coefficients represent
a. Inverse sequence values
b. Original sequence values
c. Negative values only
d. Positive values only

ANSWER: (a) Inverse sequence values

24) The region of convergence of $x/(1+2x+x^2)$ is

a. 0
b. 1
c. Negative
d. Positive

ANSWER: (b) 1

25) The IIR filter designing involves

a. Designing of analog filter in analog domain and transforming into digital domain
b. Designing of digital filter in analog domain and transforming into digital domain
c. Designing of analog filter in digital domain and transforming into analog domain
d. Designing of digital filter in digital domain and transforming into analog domain

ANSWER: (b) Designing of digital filter in analog domain and transforming into digital domain

26) For a system function H(s) to be stable

a. The zeros lie in left half of the s plane
b. The zeros lie in right half of the s plane
c. The poles lie in left half of the s plane
d. The poles lie in right half of the s plane

ANSWER: (c) The poles lie in left half of the s plane

27) IIR filter design by approximation of derivatives has the limitations

1) Used only for transforming analog high pass filters
2) Used for band pass filters having smaller resonant frequencies
3) Used only for transforming analog low pass filters
4) Used for band pass filters having high resonant frequencies

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

ANSWER: (c) 2 and 3 are correct

28) The filter that may not be realized by approximation of derivatives techniques are

1) Band pass filters
2) High pass filters
3) Low pass filters
4) Band reject filters

a. 1, 2 and 3 are correct
b. 2 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

ANSWER: (b) 2 and 4 are correct

29) In direct form for realisation of IIR filters,

1) Denominator coefficients are the multipliers in the feed forward paths
2) Multipliers in the feedback paths are the positives of the denominator coefficients
3) Numerator coefficients are the multipliers in the feed forward paths
4) Multipliers in the feedback paths are the negatives of the denominator coefficients

a. 1, 2 and 3 are correct
b. 1 and 2 are correct
c. 3 and 4 are correct
d. All the four are correct

ANSWER:(c) 3 and 4 are correct

30) The direct form II for realisation involves

1) The realisation of transfer function into two parts
2) Realisation after fraction
3) Product of two transfer functions
4) Addition of two transfer functions

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

c. 3 and 4 are correct
d. All the four are correct

ANSWER: (b) 1 and 3 are correct

31) The cascade realisation of IIR systems involves
1) The transfer function broken into product of transfer functions
2) The transfer function divided into addition of transfer functions
3) Factoring the numerator and denominator polynomials
4) Derivatives of the transfer functions

a. 1, 2 and 3 are correct
b. 1 and 3 are correct
c. 3 and 4 are correct
d. All the four are correct

ANSWER:(b) 1 and 3 are correct

32) The advantage of using the cascade form of realisation is
1) It has same number of poles and zeros as that of individual components
2) The number of poles is the product of poles of individual components
3) The number of zeros is the product of poles of individual components
4) Over all transfer function may be determined

a. 1, 2 and 3 are correct
b. 1 and 3 are correct
c. 1 and 4 are correct
d. All the four are correct

ANSWER: (c) 1 and 4 are correct

33) Which among the following represent/s the characteristic/s of an ideal filter?
a. Constant gain in passband
b. Zero gain in stop band
c. Linear Phase Response
d. All of the above

ANSWER: (d) All of the above

34) FIR filters _____
A. are non-recursive
B. do not adopt any feedback
C. are recursive
D. use feedback

a. A & B
b. C & D
c. A & D
d. B & C

ANSWER:(a) A & B

35) In tapped delay line filter, the tapped line is also known as _____
a. Pick-on node
b. Pick-off node
c. Pick-up node
d. Pick-down node

ANSWER:(b) Pick-off node

36) How is the sensitivity of filter coefficient quantization for FIR filters?
a. Low
b. Moderate
c. High
d. Unpredictable

ANSWER: (a) Low

37) Decimation is a process in which the sampling rate is _____.
a. enhanced
b. stable
c. reduced
d. unpredictable

ANSWER:(c) reduced

38) Anti-imaging filter with cut-off frequency $\omega_c = \pi / I$ is specifically used _____ upsampling process for the removal of unwanted images.
a. Before
b. At the time of
c. After
d. All of the above

ANSWER: (c) After

39) Which units are generally involved in Multiply and Accumulate (MAC)?
a. Adder
b. Multiplier
c. Accumulator
d. All of the above

ANSWER: (d) All of the above

40) In DSP processors, which among the following maintains the track of addresses of input data as well as the coefficients stored in data and program memories?
a. Data Address Generators (DAGs)
b. Program sequences
c. Barrel Shifter
d. MAC

ANSWER: (a) Data Address Generators (DAGs)

41) The cost of the digital processors is cheaper because
a. Processor allows time sharing among a number of signals
b. The hardware is cheaper
c. Require less maintenance
d. Less power consumption

ANSWER:(a) Processor allows time sharing among a number of signals

42) The operations that may be performed on vectors in Euclidean Space are

1) Inner product, distance between vectors
2) Norm of a vector, orthogonal vectors
3) Orthonormal functions
4) Vector division

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

ANSWER: (a)1, 2 and 3 are correct

43) The norm or length of a signal is given by

a. The square of the energy of the signal
b. The square root of the energy of the signal
c. The inverse of the energy of the signal
d. The cube root of the energy of the signal

ANSWER: (a) The square root of the energy of the signal

44) The principle of Gram-Schmidt Orthogonalization (GSO) states that, any set of M energy signals can be expressed as

a. Summation of N ortho normal basis functions, where $N \leq M$.
b. Linear combinations of N ortho normal basis functions, where $N \leq M$.
c. Product of logarithmic combinations of N ortho normal basis functions, where $N \leq M$.
d. Product of inverse squares of N ortho normal basis functions, where $N \leq M$.

ANSWER: (b) Linear combinations of N ortho normal basis functions, where N ≤ M.

45) A signal x[n] is anti symmetric or odd when

a. $x[-n] = x[n] \bullet x[n]$
b. $x[n] = -x[n]$
c. $x[n] = [x[n]]^2$
d. $x[-n] = -x[n]$

ANSWER: (d) x[-n] = -x[n]

46) Time shifting of discrete time signal means

a. y[n] = x[n-k]
b. y[n] = x[-n-k]
c. y[n] = -x[n-k]
d. y[n] = x[n+k]

ANSWER:(a) y[n] = x[n-k]

47) Time reversal of a discrete time signal refers to

a. y[n] = x[-n+k]
b. y[n] = x[-n]
c. y[n] = x[-n-k]
d. y[n] = x[n-k]

ANSWER: (b) y[n] = x[-n]

48) Causal systems are the systems in which

a. The output of the system depends on the present and the past inputs
b. The output of the system depends only on the present inputs
c. The output of the system depends only on the past inputs
d. The output of the system depends on the present input as well as the previous outputs

ANSWER: (a) The output of the system depends on the present and the past inputs

49) The basic properties of DFT includes

1) Linearity
2) Periodicity
3) Circular symmetry
4) Summation

a. 1, 2 and 3 are correct
b. 1, 2 and 4 are correct
c. 1 and 3 are correct
d. All the four are correct

ANSWER: (a) 1, 2 and 3 are correct

50) Padding of zeros increases the frequency resolution.
a. True
b. False

ANSWER: (b) False

51) Circular shift of an N point is equivalent to
a. Circular shift of its periodic extension and its vice versa
b. Linear shift of its periodic extension and its vice versa
c. Circular shift of its aperiodic extension and its vice versa
d. Linear shift of its aperiodic extension and its vice versa

ANSWER: (b) Linear shift of its periodic extension and its vice versa

52) The circular convolution of two sequences in time domain is equivalent to
a. Multiplication of DFTs of two sequences
b. Summation of DFTs of two sequences
c. Difference of DFTs of two sequences
d. Square of multiplication of DFTs of two sequences

ANSWER: (a) Multiplication of DFTs of two sequences

53) For the calculation of N- point DFT, Radix -2 FFT algorithm repeats
a. 2(N Log2 N) stages
b. $(N \text{ Log2 } N)^2/2$ stages
c. (N Log2 N)/2 stages
d. (N Log2(2 N))/2 stages

ANSWER: (c) (N Log2 N)/2 stages

54) Radix – 2 FFT algorithm performs the computation of DFT in
a. N/2Log2 N multiplications and 2Log2 N additions
b. N/2Log2 N multiplications and NLog2 N additions

c. Log2 N multiplications and N/2Log2 N additions
d. NLog2 N multiplications and N/2Log2 N additions

ANSWER: (b) N/2Log2 N multiplications and NLog2 N additions

55) The overlap save method is used to calculate
a. The discrete convolution between a sampled signal and a finite impulse response (FIR) filter
b. The discrete convolution between a sampled signal and an infinite impulse response (IIR) filter
c. The discrete convolution between a very long signal and a finite impulse response (FIR) filter
d. The discrete convolution between a very long signal and a infinite impulse response (IIR) filter

ANSWER: (c) The discrete convolution between a very long signal and a finite impulse response (FIR) filter

56) Overlap-Add Method Deals with principles that
a. The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length L + M – 1
b. The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length L + M
c. The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length 2L + M – 1
d. The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length 2L + 2M – 1

ANSWER:(a) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length L + M – 1

57) ROC does not have
a. zeros
b. poles
c. negative values
d. positive values

ANSWER: (b) poles

58) Damping is the ability of a system
a. To support oscillatory nature of the system's transient response
b. To oppose the continuous nature of the system's transient response
c. To oppose the oscillatory nature of the system's transient response
d. To support the discrete nature of the system's transient response

ANSWER: (c) To oppose the oscillatory nature of the system's transient response

59) The condition for a system to be causal is
a. All poles of its transfer function must be left half of s-plane
b. All poles of its transfer function must be right half of s-plane
c. All zeros of its transfer function must be right half of s-plane
d. All zeros of its transfer function must be left half of s-plane

ANSWER:(b) All poles of its transfer function must be right half of s-plane

60) The condition for a system to be stable is
a. All poles of its transfer function lie on the left half of s-plane
b. All poles of its transfer function must be right half of s-plane
c. All zeros of its transfer function must be right half of s-plane
d. All zeros of its transfer function must be left half of s-plane

ANSWER: (a) All poles of its transfer function lie on the left half of s-plane

61) Partial fraction method involves

a. Allotting coefficients
b. Dividing the numerator by denominator to get fractions
c. Dividing single fraction into parts
d. None of the above

ANSWER: (c) Dividing single fraction into parts

62) The factors formed for partial fraction are a combination of

1) Linear factors
2) Irreducible quadratic factors
3) Square roots
4) Cube roots

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

ANSWER: (b) 1 and 2 are correct

63) For a partial fraction method to be followed,

1) The degree of the numerator must be more than the degree of the denominator.
2) The factors formed for partial fraction are a combination of Linear factors and Irreducible quadratic factors.
3) The degree of the numerator must be less than the degree of the denominator.
4) The factors formed for partial fraction are a combination of Linear factors and Square roots.

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

ANSWER:(c) 2 and 3 are correct

64) The partial fraction of $x^2+1/x(x-1)^2$ is

a. $1/(x-1) + 2/(x-1)^2 - 1/x$
b. $1/(x-1) + 2/(x-1)^2 - 3/x$
c. $1/(x-1) + 2/(x-1)^2 - 3/x^2$
d. $1/(x+1) + 2/(x+1)^2 - 1/x$

ANSWER: (a) $1/(x-1) + 2/(x-1)^2 - 1/x$

65) The impulse invariant method is obtained by

a. Sampling the impulse response of an equivalent analog filter
b. Taking backward difference for the derivative
c. Mapping from s-domain to z-domain
d. Approximation of derivatives

ANSWER: (a) Sampling the impulse response of an equivalent analog filter

66) The transformation technique in which there is one to one mapping from s-domain to z-domain is

a. Approximation of derivatives
b. Impulse invariance method
c. Bilinear transformation method
d. Backward difference for the derivative

ANSWER: (c) Bilinear transformation method

67) The frequency warping is referred as

1) lower frequencies in analog domain expanded in digital domain
2) lower frequencies in digital domain expanded in analog domain
3) non linear mapping
4) compression of higher frequencies

a. 1, 3 and 4 are correct
b. 2 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

ANSWER: (a) 1, 3 and 4 are correct

68) The magnitude response of Butterworth filter has
1) Flat stop band
2) Flat pass band
3) Tapering pass band
4) Tapering stop band

a. 1 and 2 are correct
b. 2 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

ANSWER: (a) 1 and 2 are correct

69) In the cascaded form of realisation, the polynomials are factored into
a. a product of 1st-order and 2nd-order polynomials
b. a product of 2nd-order and 3rd-order polynomials
c. a sum of 1st-order and 2nd-order polynomials
d. a sum of 2nd-order and 3rd-order polynomials

ANSWER: (a) a product of 1st-order and 2nd-order polynomials

70) Parallel form of realisation is done in
a. High speed filtering applications
b. Low speed filtering applications
c. Both a and b
d. None of the above

ANSWER: (a) High speed filtering applications

71) A partial-fraction expansion of the transfer function in Z^{-1} leads to
a. The parallel form II structure
b. The parallel form I structure
c. Cascaded structure
d. None of the above

ANSWER: (b) The parallel form I structure

72) A direct partial-fraction expansion of the transfer function in Z leads to
a. The parallel form II structure
b. The parallel form I structure
c. Cascaded structure
d. None of the above

ANSWER: (a) The parallel form II structure

73) Basically, group delay is the delayed response of filter as a function of _____.
a. Phase
b. Amplitude
c. Frequency
d. All of the above

ANSWER: (c) Frequency

74) A filter is said to be linear phase filter if the phase delay and group delay are _____
a. High
b. Moderate
c. Low
d. Constant

ANSWER: (d) Constant

75) Which among the following has/have a provision to support an adaptive filtering mechanism?
a. IIR
b. FIR
c. Both a and b
d. None of the above

ANSWER: (c) Both a and b

76) Which is/are the correct way/s for the result quantization of an arithmetic operation?
a. Result Truncation
b. Result Rounding

c. Both a and b
d. None of the above

ANSWER: (c) Both a and b

77) In direct form realization for an interpolator, which among the following generates an intermediate signal?
a. Upsampler
b. Downsampler
c. Anti-imaging filter
d. Anti-aliasing filter
ANSWER: (a) Upsampler

78) To change the sampling rate for better efficiency in two or multiple stages, The decimation and interpolation factors must be _____unity.
a. Less than
b. Equal to
c. Greater than
d. None of the above

ANSWER: (c) Greater than

79) Which address/es is/are generated by Program Sequences?
a. Data Address
b. Instruction Address
c. Both a and b
d. None of the above

ANSWER: (b) Instruction Address

80) In DAGs, which register/s provide/s increment or step size for index register especially during the register move?
a. Index Register
b. Length & Base Register
c. Modify Register
d. All of the above

ANSWER: (c) Modify Register

81) Two vectors a, b are orthogonal if

a. <a,b> = 0
b. <a,b> = <a,b>
c. <a,b> = 1
d. <a,b> = – <a,b>

ANSWER: (a) <a,b> = 0

82) One dimensional signal is a function of

a. Multiple independent variables
b. Single independent variable
c. Multiple dependent variables
d. Single dependent variable

ANSWER: (b) Single independent variable

83) Superposition of signals in a linear system refers to the

a. Output that is product of all the signals
b. Output that is sum of all the signals
c. Output that is of highest amplitude of all the signals
d. Output that is of largest spectrum of all the signals

ANSWER: (b) Output that is sum of all the signals

84) The scaling of a sequence x[n] by a factor α is given by

a. $y[n] = \alpha [x[n]]^2$
b. $y[n] = \alpha x[n^2]$
c. $y[n] = \alpha x[n]$
d. $y[n] = x[n]x[-n]$

ANSWER: (c) $y[n] = \alpha x[n]$

85) DFT is applied to

a. Infinite sequences
b. Finite discrete sequences
c. Continuous infinite signals
d. Continuous finite sequences

ANSWER: (b) Finite discrete sequences

86) The filtering is performed using DFT using
1) Limited size or blocks of data
2) Small memory size
3) Large memory size
4) Large segments of data

a. 1, 2 and 3 are correct
b. 3 and 4 are correct
c. 1 and 2 are correct
d. All the four are correct

ANSWER: (c) 1 and 2 are correct

87) In Overlap-Add Method with linear convolution of a discrete-time signal of length L and a discrete-time signal of length M, for a length N, zero padding should be of length
a. L, M > N
b. L, M = N
c. L, M < N
d. L, $M < N^2$

ANSWER: (c) L, M < N

88) Discrete cosine transforms (DCTs) express a function or a signal in terms of
a. Sum of cosine functions oscillating at different frequencies
b. Sum of cosine functions oscillating at same frequencies
c. Sum of cosine functions at different sampling intervals
d. Sum of cosine functions oscillating at same sampling intervals

ANSWER: (a) Sum of cosine functions oscillating at different frequencies

89) A system is said to be unstable if
a. None of the poles of its transfer function is shifted to the right half of s-plane
b. At least one zero of its transfer function is shifted to the right half of s-plane
c. At least one pole of its transfer function is shifted to the right half of s-plane

d. At least one pole of its transfer function is shifted to the left half of s-plane

ANSWER: (c) At least one pole of its transfer function is shifted to the right half of s-plane

90) A system is said to be marginally unstable if
a. None of its zeros of its transfer function lies on the jω axis of s-plane
b. At least one zero of its transfer function lies on the jω axis of s-plane
c. None of its poles of its transfer function lies on the jω axis of s-plane
d. At least one pole of its transfer function lies on the jω axis of s-plane

ANSWER: (d) At least one pole of its transfer function lies on the jω axis of s-plane

91) The nonlinear difference equations are solved using
a. Iterative method
b. Cobweb model
c. Phase diagram
d. Power series method

ANSWER: (c) Phase diagram

92) Correlation is used for
1) Computation of average power in waveforms
2) Climatography
3) Identification of binary code word in PCM systems
4) Quantization

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

ANSWER: (a) 1, 2 and 3 are correct

93) The Chebyshev filters have
1) Flat pass band
2) Flat stop band
3) Equiripple pass band
4) Tapering stop band

a. 1 and 2 are correct
b. 2 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

ANSWER: (c) 2 and 3 are correct

94) The Elliptic filters have
1) Flat pass band
2) Flat stop band
3) Equiripple pass band
4) Equiripple stop band

a. 1 and 2 are correct
b. 3 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

ANSWER: (b) 3 and 4 are correct

95) The effects caused due to finite word lengths are
1) Coefficient quantization error
2) Adder overflow limit cycle
3) Round off noise
4) Limit cycles
a. 1, 2 and 3 are correct
b. 1 and 3 are correct
c. 1 and 4 are correct
d. All the four are correct

ANSWER: (d) All the four are correct

96) The error in the filter output that results from rounding or truncating calculations within the filter is called

a. Coefficient quantization error
b. Adder overflow limit cycle
c. Round off noise
d. Limit cycles

ANSWER: (c) Round off noise

97) Consider the assertions given below. Which among them is an advantage of FIR Filter?

a. Necessity of computational techniques for filter implementation
b. Requirement of large storage
c. Incapability of simulating prototype analog filters
d. Presence of linear phase response

ANSWER: (d) Presence of linear phase response

98) For a linear phase filter, if Z_1 is zero then what would be the value of Z_1^{-1} or $1/ Z_1$?

a. Zero
b. Unity
c. Infinity
d. Unpredictable

ANSWER: (a) Zero

99) In FIR filter design, which among the following parameters is/are separately controlled by using Kaiser window?

a. Order of filter (M)
b. Transition width of main lobe
c. Both a and b
d. None of the above

ANSWER: (c) Both a and b

100) Which window function is also regarded as 'Raised-cosine window'?
a. Hamming window
b. Hanning window
c. Barlett window
d. Blackman window

ANSWER: (b) Hanning window

101) In Barlett window, the triangular function resembles the tapering of rectangular window sequence _____ from the middle to the ends.
a. linearly
b. elliptically
c. hyperbolically
d. parabolically

ANSWER: (a) linearly

102) In Gibb's phenomenon, the ringing effect is predominantly present near the _____ .
a. bandgap
b. bandedge
c. bandwidth
d. bandshell

ANSWER: (b) bandedge

103) How is/are the roundoff errors reduced in the digital FIR filter?
a. By representation of all products with double-length registers
b. By rounding the results after acquiring the final sum
c. Both a and b
d. None of the above

ANSWER: (c) Both a and b

104) In linear phase realization, equal valued coefficients are taken common for reducing the requisite number of _____.
a. adders
b. subtractors

c. multipliers
d. dividers

ANSWER: (c) multipliers

105) Which filters exhibit their dependency upon the system design for the stability purpose?
a. FIR
b. IIR
c. Both a and b
d. None of the above

ANSWER:(b) IIR

106) In FIR filters, which among the following parameters remains unaffected by the quantization effect?
a. Magnitude Response
b. Phase Characteristics
c. Both a and b
d. None of the above

ANSWER: (b) Phase Characteristics

107) In the frequency response characteristics of FIR filter, the number of bits per coefficient should be _____in order to maintain the same error.
a. Increased
b. Constant
c. Decreased
d. None of the above

ANSWER: (a) Increased

108) In cascade form of realization, how many bits should be used to represent the FIR filter coefficients in order to avoid the quantization effect on filter coefficients?
a. 5 to 10
b. 12 to 14
c. 20 to 24
d. 28 to 40

ANSWER: (b) 12 to 14

109) Consider the assertions (steps) given below. Which among the following is a correct sequence of designing steps for the sampling rate converters?

A. Computation of decimation/interpolation factor for each stage.
B. Clarification of anti-aliasing / anti-imaging filter requirements.
C. Designing of filter at each stage.
D. Calculation of optimum stages of decimation/ interpolation yielding maximum efficient implementation.

a. A, B, C, D
b. C, A, D, B
c. D, A, B, C
d. B, D, A, C

ANSWER: (d) B, D, A, C

110) For designing a multirate LPF with passband 0 to 50 Hz, stopband 60 to 280 Hz, stopband deviation 0.001, passband deviation 0.01 and sampling frequency (f_s) = 400 Hz, what would be the value of normalized transition width?

a. 0.025 Hz
b. 1.25 Hz
c. 1.50 Hz
d. 2.6 Hz

ANSWER: (a) 0.025 Hz

111) In polyphase filters, the subfilters which share a common delay line results in the reduction of the storage requirement by factor _____

a. 1
b. 2
c. 3
d. 4

ANSWER: (c) 3

112) How is the operating level of sampling rate for the subfilters involved in the polyphase filters?
a. Low
b. Moderate
c. High
d. None of the above

ANSWER: (a) Low

113) In polyphase filter, which kind of realization is/are adopted for three subfilters possessing coefficients?
a. Cascade
b. Parallel
c. Direct
d. All of the above

ANSWER: (b) Parallel

114) How is the sampling rate conversion achieved by factor I/D?
a. By increase in the sampling rate with (I)
b. By filtering the sequence to remove unwanted images of spectra of original signal
c. By decimation of filtered signal with factor D
d. All of the above

ANSWER: (d) All of the above

115) Program Sequence plays a crucial role in maintaining the track of _____
a. Program counter increment
b. Conditional branching & looping
c. Subroutine & interrupt handling
d. All of the above

ANSWER: (d) All of the above

116) In DSP Processor, what kind of queuing is undertaken/executed through instruction register and instruction cache?

a. Implicate
b. Explicate
c. Both a and b
d. None of the above

ANSWER: (a) Implicate

117) In TMS 320 C6x processor architecture, which functional unit is adopted for transferring the data from register to and from control register?

a. L_2
b. M_2
c. S_2
d. D_2

ANSWER: (c) S_2

118) In TMS 320 C6x processor architecture, which operation/s is/are performed by 'M' functional unit?

a. Bit expansion
b. Bit interleaving & deinterleaving
c. Rotation & Variable shifting
d. All of the above

ANSWER: (d) All of the above

119) In C6X processor, which external device/s get/s acquire/s an interface support by EMIF peripheral?

a. Synchronous burst
b. Asynchronous devices
c. Externally shared memory devices
d. All of the above

ANSWER: (d) All of the above

120) Which peripheral on C 6 X processor allows buffering of serial samples in memory by port automatically & especially with an assistance of EDMA controller?

a. Boot Loader
b. HPI
c. EMIF
d. McBSP

ANSWER:(d) McBSP

121. In Fourier transform $f(p)=\int_{-\infty}^{\infty} e^{(ipx)}F(x)dx, e^{(ipx)}$ is said to be Kernel function.

a) True
b) False

Answer: a

122- Fourier Transform of $e^{-|x|}$ is $\frac{2}{1+p^2}$. Then what is the fourier transform of $e^{-2|x|}$?

a) $\frac{4}{(4+p^2)}$
b) $\frac{2}{(4+p^2)}$
c) $\frac{2}{(2+p^2)}$
d) $\frac{4}{(2+p^2)}$

Answer: a

123- What is the fourier sine transform of e^{-ax}?

a) $\frac{4}{(4+p^2)}$
b) $\frac{4a}{(4a^2+p^2)}$
c) $\frac{p}{(a^2+p^2)}$
d) $\frac{2p}{(a^2+p^2)}$

Answer: c

124- Find the fourier sine transform of $x(a^2+x^2)$.

a) $2\pi e^{-ap}$

b) $\pi 2e^{-ap}$

c) $2\pi e^{-ap}$

d) πe^{-ap}

Answer: b

125- Find the fourier transform of F(x) = 1, |x|<a0, otherwise.

a) $2\sin(ap)p$

b) $2a\sin(ap)p$

c) $4\sin(ap)p$

d) $4a\sin(ap)p$

Answer: a

126- In Finite Fourier Cosine Transform, if the upper limit l = π, then its inverse is given by _____

a) $F(x)=2\pi\sum\infty p=1fc(p)\cos(px)+1\pi fc(0)$

b) $F(x)=2\pi\sum\infty p=1fc(p)\cos(px)$

c) $F(x)=2\pi\sum\infty p=1fc(p)\cos(px\pi)$

d) $F(x)=2\pi\sum\infty p=0fc(p)\cos(px)+1\pi fc(0)$

Answer: a

127- Find the Fourier Cosine Transform of F(x) = 2x for 0<x<4.

a) $fc(p)=32(p2\pi2)(\cos(p\pi)-1)p$ not equal to 0 and if equal to 0 $fc(p)=16$
b) $fc(p)=32(p2\pi2)(\cos(p\pi)-1)p$ not equal to 0 and if equal to 0 $fc(p)=32$
c) $fc(p)=64(p\pi2)(\cos(p\pi)-1)p$ not equal to 0 and if equal to 0 $fc(p)=16$
d) $fc(p)=32(p\pi2)(\cos(p\pi)-1)p$ not equal to 0 and if equal to 0 $fc(p)=64$

Answer: a

128- If Fourier transform of $e-|x|=21+p2$, then find the fourier transform

of $t2e-|x|$.
a) $41+p2$
b) $-21+p2$
c) $21+p2$
d) $-41+p2$

Answer: b

129- If $Fc\{e-ax\}=pa2+p2$, find the $Fs\{-ae-ax\}$.

a) $4pa2+p2$
b) $-p2a2+p2$
c) $4p2a2+p2$
d) $pa2+p2$

Answer: b

130- **. Which of the following is the Analysis equation of Fourier Transform?**

a) $F(\omega)=\int\infty-\infty f(t)ej\omega tdt$

b) $F(\omega)=\int\infty 0 f(t)e-j\omega tdt$

c) $F(\omega)=\int\infty 0 f(t)ej\omega tdt$

d) $F(\omega)=\int\infty-\infty f(t)e-j\omega tdt$

Answer: d

131- Choose the correct synthesis equation.

a) $f(t)=12\pi\int\infty-\infty F(\omega)e-j\omega td\omega$

b) $f(t)=12\pi\int\infty-\infty F(\omega)ej\omega td\omega$

c) $f(t)=12\pi\int\infty 0 F(\omega)e-j\omega td\omega$

d) $f(t)=12\pi\int\infty 0 F(\omega)ej\omega td\omega$

Answer: b

132- **Find the fourier transform of an exponential signal $f(t) = e^{-at}\,u(t)$, $a>0$.**

a) $1a+j\omega$

b) $1a-j\omega$

c) $1-a+j\omega$

d) $1-a-j\omega$

Answer: a

133- Find the fourier transform of the function $f(t) = e^{-a|t|}$, $a>0$.

a) $2aa2-\omega 2$

b) $2aa2+\omega 2$

c) $2a\omega 2-a2$

d) $aa2+\omega 2$

Answer: b

134- Gate function is defined as _____
a) G(t)={10|t|<τ2elsewhere
b) G(t)={10|t|>τ2elsewhere
c) G(t)={10|t|≤τ2elsewhere
d) G(t)={10|t|≥τ2elsewhere

Answer: a

135- Find the fourier transform of the gate function.
a) 1ωsin(ωτ2)
b) 1ωcos(ωτ2)
c) 2ωsin(ωτ2)
d) 2ωcos(ωτ2)
Answer: c

136- **Choose the wrong option.**
a) G(t) = rect(tτ)
b) G(t) = u(t + τ2) – u(t-τ2)
c) G(ω) = τ sa(wτ2)
d) G(f) = τ sinc(f)
Answer: d

137- Bandwidth of the gate function is _____
a) τ Hz
b) 1τ Hz
c) 2τ Hz
d) 2τ Hz
Answer: b

138- Which of the following is not a fourier transform pair?
a) $u(t) \leftrightarrow \pi\delta(\omega)+1j\omega$
b) $sgn(t) \leftrightarrow 2j\omega$
c) $A \leftrightarrow 2\pi\delta(\omega 2)$
d) $G(t) \leftrightarrow sa(\omega\tau 2)$
Answer: d

139- Find the fourier transform of the unit step function.
a) $\pi\delta(\omega) + 1\omega$
b) $\pi\delta(\omega) + 1j\omega$
c) $\pi\delta(\omega) - 1j\omega$
d) $\delta(\omega) + 1j\omega$

Answer: b

140- The Fourier transform of a function x(t) is X(ω). What will be the Fourier transform of dX(t)dt?

a) X(f)jf
b) j2πfX(f)
c) dX(f)dt
d) jfX(f)

Answer: b

141- Find the Fourier transform of jπt.
a) sinc(ω)
b) sa(ω)
c) δ(ω)
d) sgn(ω)

Answer: d

142- The Fourier transform of a Gaussian pulse is also a Gaussian pulse.

a) True
b) False

Answer: a

143- Find the Fourier transform of $f(t)=te^{-at}u(t)$.
a) $1(a-j\omega)2$
b) $1(a+j\omega)2$
c) $a(a-j\omega)2$
d) $\omega(a-j\omega)2$

Answer: b

144- Find the Fourier transform of $e^{j\omega_0 t}$.
a) $\delta(\omega + \omega_0)$
b) $2\pi\delta(\omega + \omega_0)$
c) $\delta(\omega - \omega_0)$
d) $2\pi\delta(\omega - \omega_0)$

Answer: d

145- Find the Fourier transform of u(-t).
a) $\pi\delta(\omega) + 1\omega$
b) $\pi\delta(\omega) + 1j\omega$

c) πδ(ω) – 1jω
d) δ(ω) + 1jω

Answer: c

146- **Find the Fourier transform of x(t) = f(t – 2) + f(t + 2).**

a) 2F(ω)cos⁡2ω
b) F(ω)cos⁡2ω
c) 2F(ω)sin⁡2ω
d) F(ω)sin⁡2ω

Answer: a

147- Find the Fourier transform of 1a+jt.
a) $2\pi e^{a\omega}\, u(\omega)$
b) $2\pi e^{a\omega}\, u(-\omega)$
c) $2\pi e^{-a\omega}\, u(\omega)$
d) $2\pi e^{-a\omega}\, u(-\omega)$

Answer: b

148- Find the Fourier transform of $e^{-2t}\, u(t-1)$.
a) e−2[e−jω12−jω]
b) e2[e−jω12−jω]
c) e−2[ejω12−jω]
d) e−2[e−jω12+jω]

Answer: d

149- Find the Fourier transform of sinc(t).
a) G_{π} (ω)
b) $G_{2\pi}$ (ω)
c) Gπ2 (ω)
d) G_{π} (-ω)

Answer: b

150- Find the inverse Fourier transform of X(ω) = $e^{-2\omega}$ u(ω).
a) 12π(2+jt)
b) 12π(2−jt)
c) 12(2+jt)
d) 1π(2+jt)

Answer: b

151- Find the inverse Fourier transform of X(ω) = 1+3(jω)(3+jω)2.
a) $3e^{-3t}$ u(t) + $8e^{-3t}$ u(t)
b) $3te^{-3t}$ u(t) – $8e^{-8t}$ u(t)
c) $3e^{-3t}$ u(t) + $8te^{8t}$ u(t)
d) $3e^{-3t}$ u(t) – $8te^{-3t}$ u(t)

Answer: d

152- Find the inverse Fourier transform of δ(ω).
a) 12π

b) 2π
c) 1π
d) π

Answer: d

153- Find the inverse Fourier transform of u(ω).
a) 12δ(t)+j2πt
b) 12δ(t)–j2πt
c) δ(t) + j2πt
d) δ(t) – j2πt

Answer: a

154- Find the inverse Fourier transform of e^{j2t}.

a) 2πδ(ω-2)
b) πδ(ω-2)
c) πδ(ω+2)
d) 2πδ(ω+2)

Answer: a

155- Find the inverse Fourier transform of jω.
a) δ(t)
b) ddt δ(t)
c) 1δ(t)
d) ∫δ(t)

Answer: b

156- Find the inverse Fourier transform of X(ω)=6+4(jω)(jω)2+6(jω)+8.
a) e^{-2t} u(t) – 5e^{-4t} u(t)
b) e^{-2t} u(t) + 5e^{-4t} u(t)
c) -e^{-2t} u(t) – 5e^{-4t} u(t)
d) -e^{-2t} u(t) + 5e^{-4t} u(t)

Answer: d

157- Find the convolution of the signals x_1 (t) = e^{-2t} u(t) and x_2 (t) = e^{-3t} u(t).
a) e^{-2t} u(t) – e^{-3t} u(t)
b) e^{-2t} u(t) + e^{-3t} u(t)
c) e^{2t} u(t) – e^{3t} u(t)
d) e^{2t} u(t) – e^{-3t} u(t)

Answer: a

158- Find the inverse Fourier transform of f(t)=1.

a) u(t)

b) δ(t)

c) e^{-t}

d) 1jω

Answer: b

159- Find the inverse Fourier transform of sgn(ω).

a) 1πt

b) jπt

c) jt

d) 1t

Answer: b