SRI SAIRAM ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SAMPLE QUESTIONS FOR TEACHING LEARNING PROCESS

Domain: **SIGNALS AND SYSTEMS**

1) What should be the value of Laplace transform for the time-domain signal equation e^{-at} cos ωt. u(t)?

a. 1 / s + a with ROC σ > - a

b. ω / (s + a) 2 + ω2 with ROC σ > - a

c. s + a / (s + a)2 + ω2 with ROC σ > - a

d. Aω / s2 + ω2 with ROC σ > 0

2) According to the time-shifting property of Laplace Transform, shifting the signal in time domain corresponds to the _____

a. Multiplication by e-st0 in the time domain

b. Multiplication by e-st0 in the frequency domain

c. Multiplication by est0 in the time domain

d. Multiplication by est0 in the frequency domain

3) Which result is generated/ obtained by the addition of a step to a ramp function?

a. Step Function shifted by an amount equal to ramp

b. Ramp Function shifted by an amount equal to step

c. Ramp function of zero slope

d. Step function of zero slope

4) Unilateral Laplace Transform is applicable for the determination of linear constant coefficient differential equations with _____

a. Zero initial condition

b. Non-zero initial condition

c. Zero final condition

d. Non-zero final condition

5) What should be location of poles corresponding to ROC for bilateral Inverse Laplace Transform especially for determining the nature of time domain signal?

a. On L.H.S of ROC

b. On R.H.S of ROC

c. On both sides of ROC

d. None of the above

6) Generally, the convolution process associated with the Laplace Transform in time domain results into_____

a. Simple multiplication in complex frequency domain

b. Simple division in complex frequency domain

c. Simple multiplication in complex time domain

d. Simple division in complex time domain

7) An impulse response of the system at initially rest condition is basically a response to its input & hence also regarded as,

a. Black's function

b. Red's function

c. Green's function

d. None of the above

8) When is the system said to be causal as well as stable in accordance to pole/zero of ROC specified by system transfer function?

a. Only if all the poles of system transfer function lie in left-half of S-plane

b. Only if all the poles of system transfer function lie in right-half of S-plane

c. Only if all the poles of system transfer function lie at the centre of S-plane

d. None of the above

9) Correlogram is a graph of _____

a. Amplitude of one signal plotted against the amplitude of another signal

b. Frequency of one signal plotted against the frequency of another signal

c. Amplitude of one signal plotted against the frequency of another signal

d. Frequency of one signal plotted against the time period of another signal

10) Which theorem states that the total average power of a periodic signal is equal to the sum of average powers of the individual Fourier coefficients?

a. Parseval's Theorem

b. Rayleigh's Theorem

c. Both a & b

d. None of the above

11) According to Rayleigh's theorem, it becomes possible to determine the energy of a signal by_____

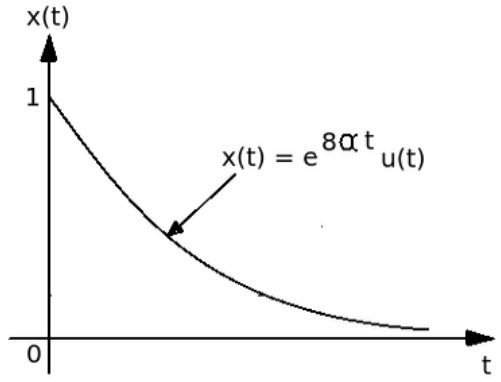
a. Estimating the area under the square root of its amplitude spectrum

b. Estimating the area under the square of its amplitude spectrum

c. Estimating the area under the one-fourth power of its amplitude spectrum

d. Estimating the area exactly half as that of its amplitude spectrum

12) What would be the value of normalized energy for the causal exponential pulse shown below?



Causal Exponential Pulse

a. 8α

b. 1 / 8α

c. -1 / 8α

d. -8α

13) What does the spectral density function of any signal specify?

a. Distribution of energy or power

b. Consumption of energy or power

c. Conservation of energy or power

d. Generation of energy or power

14) Which among the below mentioned transform pairs is/are formed between the auto-correlation function and the energy spectral density, in accordance to the property of Energy Spectral Density (ESD)?

a. Laplace Transform

b. Z-Transform

c. Fourier Transform

d. All of the above

15) The ESD of a real valued energy signal is always _____

a. An even (symmetric) function of frequency

b. An odd (non-symmetric) function of frequency

c. A function that is odd and half-wave symmetric

d. None of the above

16) Which among the below mentioned assertions is /are correct?

I. Greater the value of correlation function, higher is the similarity level between two signals

II. Greater the value of correlation function, lower is the similarity level between two signals

III. Lesser the value of correlation function, higher is the similarity level between two signals

IV. Lesser the value of correlation function, lower is the similarity level between two signals

a. Only IV

b. Only II

c. I & IV

d. II & III

17) Which function has a provision of determining the similarity between the signal and its delayed version?

a. Auto-correlation Function

b. Cross-correlation Function

c. Both a & b

d. None of the above

18) Which property is exhibited by the auto-correlation function of a complex valued signal?

a. Commutative property

b. Distributive property

c. Conjugate property

d. Associative property

19) Where does the maximum value of auto-correlation function of a power signal occur?

a. At origin

b. At extremities

c. At unity

d. At infinity

20) What does the set comprising all possible outcomes of an experiment known as?

a. Null event

b. Sure event

c. Elementary event

d. None of the above

21) What does the spectral density function of any signal specify?

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22) What would be the value of normalized energy for the causal exponential pulse shown below?

a. 8α

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b. Estimating the area under the square of its amplitude spectrum

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24) Which theorem states that the total average power of a periodic signal is equal to the sum of average powers of the individual fourier coefficients?

a. Parseval's Theorem

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25) Correlogram is a graph of _____

a. Amplitude of one signal plotted against the amplitude of another signal

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26) When is the system said to be causal as well as stable in accordance to pole/zero of ROC specified by system transfer function?

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27) An impulse response of the system at initially rest condition is basically a response to its input & hence also regarded as,

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28) Generally, the convolution process associated with the Laplace Transform in time domain results into_____

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29) What should be location of poles corresponding to ROC for bilateral Inverse Laplace Transform especially for determining the nature of time domain signal?

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30) Unilateral Laplace Transform is applicable for the determination of linear constant coefficient differential equations with _____

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c. s + a / (s + a)2 + ω2 with ROC σ > - a

d. Aω / s2 + ω2 with ROC σ > 0

34) Where is the ROC defined or specified for the signals containing causal as well as anti-causal terms?

a. Greater than the largest pole

b. Less than the smallest pole

c. Between two poles

d. Cannot be defined

35) A Laplace Transform exists when _____

A. The function is piece-wise continuous

B. The function is of exponential order

C. The function is piecewise discrete

D. The function is of differential order

a. A & B

b. C & D

c. A & D

d. B & C

36) Which property of periodic signal in DTFS gets completely clarified / identified by the equation x (n – n0)?

a. Conjugation

b. Time Shifting

c. Frequency Shifting

d. Time Reversal

37) What is the nature of Fourier representation of a discrete & aperiodic signal?

a. Continuous & periodic

b. Discrete & aperiodic

c. Continuous & aperiodic

d. Discrete & periodic

38) Which among the following assertions represents a necessary condition for the existence of Fourier Transform of discrete time signal (DTFT)?

a. Discrete Time Signal should be absolutely summable

b. Discrete Time Signal should be absolutely multipliable

c. Discrete Time Signal should be absolutely integrable

d. Discrete Time Signal should be absolutely differentiable

39) What is the possible range of frequency spectrum for discrete time fourier series (DTFS)?

a. 0 to 2π

b. $-\pi$ to $+\pi$

c. Both a & b

d. None of the above

40) What is/are the crucial purposes of using the Fourier Transform while analyzing any elementary signals at different frequencies?

a. Transformation from time domain to frequency domain

b. Plotting of amplitude & phase spectrum

c. Both a & b

d. None of the above

41) Which is/are the mandatory condition/s to get satisfied by the transfer function for the purpose of distortionless transmission?

a. Amplitude Response should be constant for all frequencies

b. Phase should be linear with frequency passing through zero

c. Both a & b

d. None of the above

42) Which among the below assertions is precise in accordance to the effect of time scaling?

A : Inverse relationship exists between the time and frequency domain representation of signal

B : A signal must be necessarily limited in time as well as frequency domains

a. A is true & B is false

b. A is false & B is true

c. Both A & B are true

d. Both A & B are false

43) Which property of fourier transform gives rise to an additional phase shift of -2π ftd for the generated time delay in the communication system without affecting an amplitude spectrum?

a. Time Scaling

b. Linearity

c. Time Shifting

d. Duality

44) Duality Theorem / Property of Fourier Transform states that _____

a. Shape of signal in time domain & shape of spectrum can be interchangeable

b. Shape of signal in frequency domain & shape of spectrum can be interchangeable

c. Shape of signal in time domain & shape of spectrum can never be interchangeable

d. Shape of signal in time domain & shape of spectrum can never be interchangeable

45) Why are the negative & positive phase shifts introduced for positive & negative frequencies respectively in amplitude and phase spectra?

a. To change the symmetry of the phase spectrum

b. To maintain the symmetry of the phase spectrum

c. Both a & b

d. None of the above

46) Which phenomenon occurs due to an increase in the channel bandwidth during the transmission of narrow pulses in order to avoid any intervention of signal distortion?

a. Compression in time domain

b. Expansion in time domain

c. Compression in frequency domain

d. Expansion in frequency domain

47) As the signalling rate increases, _____

a. Width of each pulse increases

b. Width of each pulse decreases

c. Width of each pulse remains unaffected

d. None of the above

48) What does the signalling rate in the digital communication system imply?

a. Number of digital pulses transmitted per second

b. Number of digital pulses transmitted per minute

c. Number of digital pulses received per second

d. Number of digital pulses received per minute

49) Which type/s of Fourier Series allow/s to represent the negative frequencies by plotting the double-sided spectrum for the analysis of periodic signals?

a. Trigonometric Fourier Series

b. Polar Fourier Series

c. Exponential Fourier Series

d. All of the above

50) Which kind of frequency spectrum/spectra is/are obtained from the line spectrum of a continuous signal on the basis of Polar Fourier Series Method?

a. Continuous in nature

b. Discrete in nature

c. Sampled in nature

d. All of the above