SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : SIGNALS AND SYSTEMS(18EC403)   **Course & Branch**: B.Tech - EEE

Year & Sem: II B.Tech & II Sem   **Regulation:** R18

UNIT –I

INTRODUCTION TO SIGNALS AND SYSTEMS

SHORT ANSWER QUESTIONS (2 MARKS)

1. Define a Signal. What is the relation between impulse, step, ramp and parabolic signals?
[L1][CO1][2M]
2. How are the signals are classified?   [L1][CO1][2M]
3. Define Unit impulse and Unit step Signals.   [L1][CO1][2M]
4. Distinguish between periodic and non-periodic signals   [L4][CO1][2M]
5. Distinguish causal and anti-causal signals.   [L4][CO1][2M]
6. Define Linear and Non-Linear System   [L1][CO1][2M]
7. Define time-variant and time-invariant systems.   [L1][CO1][2M]
8. How are systems classified?   [L1][CO1][2M]
9. Define stable and unstable systems.   [L1][CO1][2M]
10. Define causal and non-causal systems.   [L1][CO1][2M]

LONG ANSWER QUESTIONS (10 MARKS)

1. Define various elementary signals in continuous time and discrete time and indicate them graphically
[L1][CO1][10M]
2. What are the basic operations on signals? Illustrate with an example.   [L1][CO1][10M]
3. Explain the classification of signals in both continuous time and discrete time with suitable examples.
[L2][CO1][10M]
4.(a) Find which of the signals are causal or non-causal.   [L1][CO1][05M]
    (i) $x(t)= e^{2t} u(t-1)$ (ii) $x(t)=3$ sinc $2t$ (iii) $x(n)=u(n+4)-u(n-2)$ (iv) $x(t)=u(-n)$
 (b) Sketch the following signals   [L1][CO1][05M]
    (i) $2 u(t+2)- 2 u(t-3)$ (ii) $u(t+4) u(-t+4)$ (iii) $r(t)-r(t-1)-r(t-3)-r(t-4)$ (iv) $\pi(t-2)$
5. Find whether the following signals are periodic or not? If periodic determine the fundamental Period
    (a) $\sin 12\pi t$ (b)$3\sin 200\pi t+4 \cos100t$ (c) $\sin10\pi t+\cos20\pi t$
    (d)$\sin (10t+1)- 2\cos (5t-2)$ (e) $e^{j4\pi t}$ [L1][CO1][10M]
6. (a) Find the even and odd components of the following signals   [L1][CO1][05M]
    (i) $x(t)= e^{j2t}$ (ii) $x(t) =(1+t^2+t^3) \cos^2 10t$ (iii) $x(n)=\{-3,1, 2, -4,2\}$ (iv) $x(n)=\{5,4,3,2,1\}$
                                        ↑

 (b)Determine whether the following signals are energy signals or power signals. Calculate their energy
        or power?   [L1][CO1][05M]
    (i)$x(t)= 8 \cos4t \cos6t$ (ii) $\sin^2 \omega_0 t$ (iii) $x(t)= e^{j[3t+(\pi/2)]}$ (iv) $x(n)=(1/2)^n u(n)$
7. Define a system. How are systems classified? Define each one of them.   [L4][CO1][10M]
8. Check whether the following system is   [L1][CO1][10M]
 (a) Static or dynamic   (b) linear or non- linear
 (c) Causal or non- causal   (d) Time invariant or time variant

(i)$d^3y(t)/dt^3+2d^2y(t)/dt^2+4\ dy(t)/dt+3y^2(t)=x(t+1)$

(ii)$d^2y(t)/dt^2+2y(t)\ dy(t)/dt+3ty(t)=x(t)$

9. Check whether the following system is   [L1][CO1][10M]
 (a) Static or dynamic   (b) linear or non- linear
 (c) Causal or non- causal   (d) Time invariant or time variant
     (i)$y(n)=\log_{10}\left|x(n)\right|$ (ii) $y(n)=x^2(n)+1/x^2(n-1)$ (iii) $y(t)=at^2\ x(t)+bt\ x(t-4)$

10.(a) Check whether the following systems are causal or not?   [L1][CO1][05M]
     (i)$y(t)=x^2(t)+x(t-4)$ (ii) $y(t)=x(t/2)$ (iii)$y(n)=x(2n)$
 (b) Find whether the following systems are stable or not   [L1][CO1][05M]
   (i) $y(t)=(t+5)\ u(t)$ (ii) $y(t)=(2+e^{-3t})\ u(t)$ (iii) $h(n)=a^n$ for $0<n<11$

UNIT –II

FOURIER SERIES AND FOURIER TRANSFORM

SHORT ANSWER QUESTIONS

1. What is Fourier Series.   [L1][CO2][2M]
2. Waht is the three important classes of Fourier series methods available.   [L1][CO2][2M]
3. What are the Dirichlet's conditions? State them.   [L1][CO2][2M]
4. What is the Relationship between exponential Fourier series and trigonometric Fourier series coefficients?   [L1][CO2][2M]
5. How do you obtain Cosine Fourier series from exponential Fourier series?   [L1][CO2][2M]
6. Differentiate the Fourier series and Fourier transform.   [L1][CO2][2M]
7. What is Fourier transform?   [L1][CO2][2M]
8. Define Linearity Property of Fourier Transform   [L1][CO2][2M]
9. What are the Merits of Fourier Transform?   [L1][CO2][2M]
10. Define Fourier transform and Inverse Fourier transform of discrete time signal. [L1][CO2][2M]

LONG ANSWER QUESTIONS

1. Find the Fourier series expansion of the half wave rectified sine wave shown in figure.
                                                                                 [L1][CO2][10M]
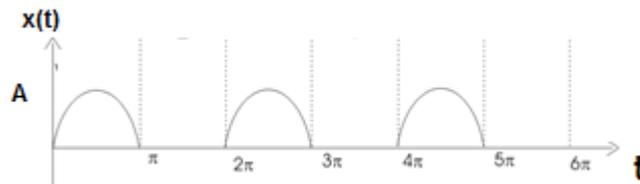
2. State and Prove any Five Properties of the Fourier Series.   [L3][CO2][10M]

3. Find the trigonometric Fourier series for the periodic signal $x(t)$ shown in below   [L3][CO2][10M]
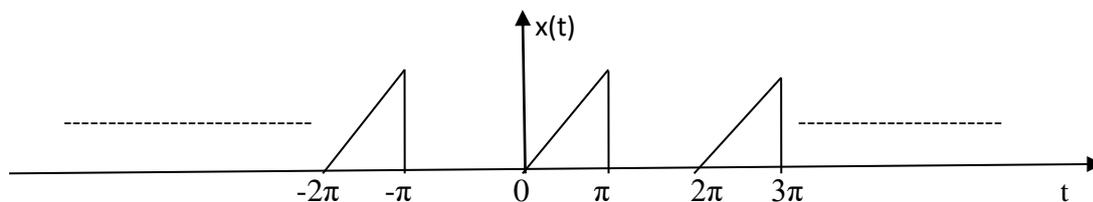
4. Explain about exponential Fourier series and derive the Fourier series coefficient   [L1][CO2][10M]

5. Find the trigonometric Fourier series for the periodic signal $x(t)$ shown in below.
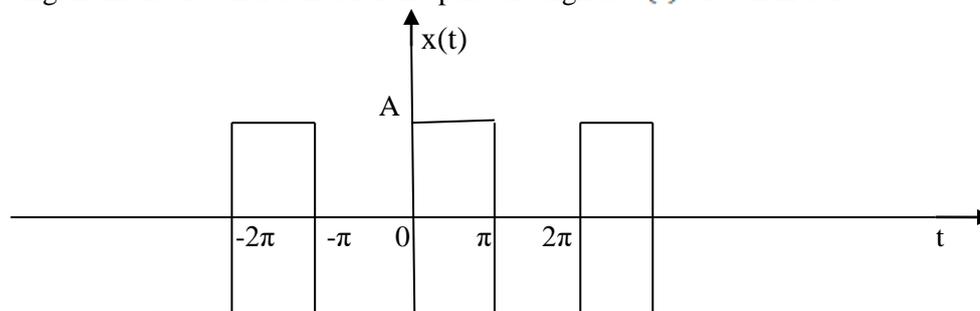
6. (a) Find the Fourier transform of the following   [L1][CO2][05M]

     (i) sgn(t)   (ii) sin ω_0t   (iii)cos ω_0t   (iv) 1(Constant Amplitude)

(b). Find the Fourier transform of the following   [L1][CO2][5M]

     (i) impulse function   (ii) x(t)=e^{-at} u(t)   (iii) x(t)=$e^{j\omega_0 t}$ (iv) x(t)=u(t)

7. State and Prove the properties of Continuous time Fourier transform?   [L1][CO2][10M]

8. Find the Fourier transform of the following signals   [L1][CO2][10M]

     (i) x(t)=e^{-3t}u(t)   (ii) x(t)=te^{-at} u(t)   (iii) x(t)=e^{-t} sin 5t u(t)   (iv) x(t) = e^{-t} cos5t u(t)

9. Find the inverse Fourier transform of the following signals   [L1][CO2][10M]

     (i) X(w)=$\dfrac{4(jw)+6}{(jw)2+6(jw)+8}$ (ii) X(W)=$\dfrac{1+3(jw)}{(jw+3)2}$ (iii) X(w)=e^{-2w}u(w)

10. (a) State and prove any three properties of the DTFT.   [L2][CO2][5M]

   (b) Find the Fourier Transform of the Signal (i) Triangular Pulse (ii) $e^{-a|t|}$ [L1][CO2][5M]

UNIT –III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTESMS

SHORT ANSWER QUESTIONS

1. What are the properties of LTI systems?   [L1][CO3][2M]
2. Define transfer function of a system?   [L1][CO3][2M]
3. Define impulse response of a system.   [L1][CO3][2M]
4. What is a filter? How are filters classified?   [L1][CO3][2M]
5. What is the Relation between unit step and impulse response?   [L1][CO3][2M]
6. Define sampling and sampling period?   [L1][CO3][2M]
7. State Sampling theorem   [L1][CO3][2M]
8. What is Nyquist rate and Nyquist interval?   [L1][CO3][2M]
9. What is anti-aliasing filter?   [L1][CO3][2M]
10. State Sampling theorem?   [L1][CO3][2M]

LONG ANSWER QUESTIONS

1. (a) Explain the Filter characteristics of linear systems explain with neat diagrams   [L1][CO3[5M]

   (b) Define the following   (i)Impulse Response   (ii)Step Response   (iii) Response of the System

                            [L1][CO3][5M]

2. (a) Derive the transfer function and impulse response of an LTI system.   [L1][CO3][5M]

   (b) Define Linear time variant, Linear time-invariant, step response of the system.   [L2][CO3][5M]

3. Discuss the properties of linear time invariant systems.   [CO3][10M]

4. (a) Consider a stable LTI System characterized by the differential equation dy(t)/dt+2y(t)=x(t), Find its impulse response.   [L3][CO3][5M]

   (b) Find the Nyquist Rate and Nyquist Interval of the following signals.   [L2][CO3][5M]

      (i)x(t)=1+cos 2000 πt + sin 4000 πt   (ii) x(t)=10 sin 40πt cos 300πt

5. (a) Let the system function of an LTI system be 1/(jω+2). What is the output of the system   for an input $(0.8)^t$ u(t)?   [L3][CO3][5M]

   (b) Consider a causal LTI system with frequency response H(ω)=1/4+jω, for a input

    x(t), the system is observed to produce the output y(t)=e^{-2t}u(t)- e^{-4t}u(t). Find the input x(t).

                            [L1][CO3][5M]

6. Consider a stable LTI system that is characterized by the differential equation   [L3][CO3][10M]

     d^2y(t)/dt^2+4dy(t)/dt+3y(t)= dx(t)/dt+2x(t) find the response for an input x(t)=e^{-t} u(t).

7. Find the Nyquist rate and Nyquist interval for the following signals   [L1][CO3][10M]

(i) x(t)=1+cos 2000 πt +sin 4000 πt   (ii) 10 sin 40πt cos 300πt
(iii)x(t)=sinc (100 πt) + 3 sinc^2 (60 πt)   (iv) x(t)= 2 sinc (100 πt)

8. State and prove the sampling theorem for the band-limited signals with the help of graphical representation.   [L1][CO3][10M]

9. (a) Discuss about Effects of the under sampling.   [L4][CO3][05M]
   (b) A system produces an output of y(t)= e^{-3t} u(t) for an input of x(t)= e^{-5t} u(t). Determine the impulse response and frequency response of the system.   [L3][CO3][05M]

10. signal x(t) = 2 cos 400πt + 6 cos 640πt is ideally sampled at fs= 500 Hz . If the sampled signal is passed through an ideal LPF with a cut off frequency of 400Hz, what frequency components will appear in the output? Find the output signal.   [L3][CO3][10M]

UNIT –IV

CONVOLUTION AND CORRELATION OF SIGNALS

SHORT ANSWER QUESTIONS

1. What is convolution? State the shift property of convolution.   [L1][CO4][2M]
2. State Time convolution and Frequency convolution theorem   [L1][CO4][2M]
3. What is correlation and types of correlation?   [L1][CO4][2M]
4. What are the properties of cross correlation for energy signals?   [L1][CO4][2M]
5. What are the properties of auto correlation for power signals?   [L1][CO4][2M]
6. What is the relation between convolution and correlation?   [L1][CO4][2M]
7. What are the Properties of ESD?   [L1][CO4][2M]
8. Differentiate ESD and PSD?   [L1][CO4][2M]
9. State Parseval's energy theorem?   [L1][CO4][2M]
10. State Parseval's power theorem?   [L1][CO4][2M]

LONG ANSWER QUESTIONS

1. (a) Write the properties of convolution.   [L1][CO4][05M]
   (b) Find the convolution of the following signal x$_1$(t)= $e^{-2t}\,u(t)$, x$_2$(t)=$e^{-4t}\,u(t)$ [L1]CO4][05M]

2. (a) State and prove the time convolution theorem with Fourier transforms.   [L1][CO4][05M]
   (b) State and prove the frequency convolution theorem with Fourier transforms.   [L1][CO4][05M]

3. (a) Derive the relation between convolution and correlation.   [L2][CO4][05M]
   (b). Write the properties of cross correlation for energy signals   [L1][CO4][05M]

4. (a) State and prove the Parseval's theorem for energy signals.   [L3][CO5][05M]
   (b) State and prove the Parseval's theorem for power signals.   [L3][CO4][05M]

5. (a) Derive and Define the properties of Energy Spectral Density.   [L1][CO4][05M]
   (b) Derive and Define the properties of Power Spectral Density   [L1][CO4][05M]

6. (a) Show that R(r) and ESD form Fourier transform pair.   [L1][CO4][05M]
   (b) Show that R(r) and PSD form Fourier transform pair.   [L1][CO4][05M]

7. (a) Verify Parseval's theorem for the energy signal x(t)=e^{-4t} u(t).   [L2][CO4][05M]
   (b) Determine the autocorrelation function and energy spectral density of x(t)=e^{-at} u(t).
        [L3][CO4][05M]

8. (a) Find the autocorrelation of the signal x(t)= a sin (ω_0t +θ).

[L3][CO4][05M]

   (b) Distinguish the ESD and PSD.

[L4][CO4][05M]

9. (a) Explain the detection of periodic signals in the presence of noise by auto correlation.

[L1][CO4][05M]

   (b) Explain the detection of periodic signals in the presence of noise by cross correlation

[L1][CO4][05M]

   Explain the extraction of noise by Filtering.

10. Explain the extraction of a signal from noise by filtering.

[L1][CO4][10M]

UNIT –V

LAPLACE TRANSFORMS AND Z-TRANSFORMS

SHORT ANSWER QUESTIONS

1. What is the Region of Convergence (ROC)? [L1][CO5][2M]
2. What is the relation between Laplace transform and Fourier transform? [L1][CO5][2M]
3. State initial value theorem and final value theorem of Laplace transform. [L1][CO5][2M]
4. What are the properties of ROC? [L1][CO5][2M]
5. What is the Laplace Transform of Parabolic Function.? [L1][CO5][2M]
6. What is the relation between Discrete-time Fourier transform and Z-transform? [L1][CO5][2M]
7. What is the Z-transform of unit step signal? [L1][CO5][2M]
8. Find Z-transform and ROC of $x(n)=(1/2)^n u(n-2)$ [L1][CO5][2M]
9. State the Convolution Property of Z-transform [L1][CO5][2M]
10. Discuss the comparison of Laplace and Z-Transform. [L1][CO5][2M]

LONG ANSWER QUESTIONS

1. State and prove the any five Properties Laplace Transform [L3][CO5][10M]
2. (a) Find the Laplace transform of the signal $x(t)= e^{-at} u(t) - e^{-bt} u(-t)$ and also find its ROC
   [L1][CO5][05M]
   (b) Find the Laplace transforms and region for the following signals [L1][CO5][05M]
      (i)$x(t)=e^{-5t} u(t-1)$ (ii)$x(t)=e^{2t} \sin 2t$ for $t \leq 0$ (iii) $x(t)=t\, e^{-2|t|}$
3. Find the Laplace transform of the following signals using properties of Laplace transform
   [L1][CO5][10M]
   (i) $x(t)=t\, e^{-t} u(t)$ (ii) $x(t)=t\, e^{-2t} \sin 2t\, u(t)$ (iii)$x(t)= \sin at/t$ (iv) $x(t)=1-e^t/t$
4. Find the inverse Laplace transform of the following [L1][CO5] [10M]
   (a)$X(s) = 1/ s(s+1) (s+2) (s+3)$ (b) $X(s)= (3s^2+22s+27)/(s^2+3s+2)(s^2+2s+5)$
   (c) $X(s)=s/(s+3)(s^2+4s+5)$
5. (a) Find the convolution of the sequences:
        (i)   (ii) [L1][CO5][05M]
   (b) Discuss about the Properties of the ROC of Laplace transform
   [L3][CO5][05M]
6. (a) State and prove time differentiation and time integration property of Laplace transform
   [L1][CO5][05M]
   (b). Find the Laplace transform for any 5 standard signals [L1][CO5][05M]
7. Find the inverse z-transform of: [L1][CO5][05M]
            $X(z)=3z^{-1}/(1-z^{-1}) (1-2z^{-1})$
   (a)If ROC; $|z|>2$ (b) If ROC ; $|z|<1$ (c) If ROC ; $1<|z|<2$
8. (a) Find the inverse Z-transform of X(z) given $X(z) = 1/(1-az^{-1})$, ROC; $z|>|a|$ [L1][CO5][05M]
   (b) Find the convolution of the sequences: [L1][CO5] [05M]
            $x_1(n)=(1/2)^n u(n)$ and $(1/3)^{n-2}u(n)$
9. (a) State and prove initial and final value theorems of Z-transform? [L3][CO5][05M]
   (b) Using the Properties of Z-transform. Find the Z-transform of following signals
   [L1][CO5][05M]
      (i) $x(n)=u(-n)$ (ii) $x(n)=2^n u(n-2)$ (iii) $2(3)^n u(-n)$

10. (a) Prove that the final value of x(n) for $X(z) = z^2/(z-1)(z-0.2)$ is 1.25 and its final value is unity?
[L3][CO5] [05M]

(b). Find the inverse Z-transform of $X(z) = z^{-1}/(3-4z^{-1}+z^{-2})$, ROC: $|z|>1$ [L1][CO5][05M]

SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR

Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (OBJECTIVE)

Subject with Code : SIGNALS AND SYSTEMS(16EC403) **Course & Branch**: B.Tech – ECE

Year & Sem: II B.Tech & I Sem   **Regulation:** R18

UNIT – I

INTRODUCTION TO SIGNALS AND SYSTEMS

1. In continuous time signal, independent variable nature is_____   [   ]

A) Continuous   B) Discrete   C) Exponential   D) None

2. In discrete time signal, independent variable nature is_____   [   ]

A) Continuous   B) Discrete   C) Exponential   D) None

3. Generally x $(t + 2)$ means   [   ]

A) x (t) delayed by 2 units B) x(t) advanced by 2 units C) x(t) delayed by 4 units D) none

4. Generally $x(t - 2)$ means   [   ]

A) x(t) delayed by 2 units B) x(t) advanced by 2 units C) x(t) delayed by 4 units D) none

5. Generally $x(2n)$ means   [   ]

A) Expansion version of x(n)   B)Compression version of x(n)

C) Delayed version of x(n)   D)none

6. Generally $x(n/2)$ means   [   ]

A) Expansion version of x(n)   B) Compression version of x(n)

C) Delayed version of x(n)   D) none

7. A discrete signal is said to be periodic signal, it satisfy _____ condition   [   ]

A) x(n)= x(2n)   B) x(n)= x(n+N)   C) x(t)= x(t+T)   D) None

8. _____ is the fundamental period of x(n)=cos0.02πn   [   ]

A) 1/100   B) 100   C) 200   D) None

9. A signal is said to be even signal, it satisfy _____ condition   [   ]

A) x(-t) = x(t)   B) x(-t) = -x(t)   C) x(t) = x(t²)   D) None

10. A signal is said to be energy signal, it satisfy _____ condition   [   ]

A) 0<E<∞ & p=0 B)0<E<∞ & p=∞   C) 0<E<∞ & p=1   D) None

11. A signal is said to be power signal, it satisfy _____ condition   [   ]

A) 0<p<∞ & E=0 B) 0<p<∞ & E=∞   C)0<p<∞ & E=1   D) None

12. Following statement is true for unit impulse signal   [   ]

δ(n)=1 for n≠0   B) δ(n) = 1 for n=0   C) δ(n)=0 for n=0   D)None

13. Following statement is true for unit step signal   [   ]

A) u(n)=1 for n <0   B) u(n) =1 for n >0   C)u(n)=1 for n=0   D)None

14. _____ is the relation between unit impulse &unit step signal   [   ]

A) δ(n)= u(n)-u(n-1)   B) δ(n)=u(n)   C) δ(n)=u(n)=u(n-1) D)None

15. Following statement is true for continuous time unit step   [   ]

A) u (t)=1 for t>0 B) u(t)=1 for t<0   C) u(t)=1 for t=0   D) None

16. A system is said to be linear system, it satisfy   ----   [   ]

A) superposition property B)homogeneity property   C)a& b   D) None

17. y(t)=2 x(t), system is linear or nonlinear   [   ]

A) Linear   B) Nonlinear   C) both   D) None

18. y(t)=sin x(t),then system is time variant or time invariant   [   ]

A) Time variant   B) Time invariant   C) both   D) None

19. y(n)=2 x(n)-x^2(n), system is memory or memory less   [   ]

A) Memory less   B) memory   C) both   D) none

20. y(n)=x(n-1),system is causal or non-causal   [   ]

A) Non causal   B) causal   C)both   D) none

21. Generally x(t+3) means   [   ]

A) x(t) delayed by 3 units B)x(t) advanced by 3 units   C) both   D) None

22. A continuous signal is said to be periodic signal, it satisfy _____ condition [   ]

A) x(n)= x(2n)   B) x(n)= x(n+N)   C) x(t)= x(t+T)   D) None

23. _____ is the fundamental period of x(n)=cos 0.04πn   [   ]

A) 100   B) 200   C) 300   D) 50

24. y(t)=8 x(t), system is linear or nonlinear   [   ]

A) Linear B) nonlinear   C) both   D) None

25. --- is example for memory system   [   ]

A) Capacitor   B) inductor   C) resistor   D) None

26. Generally x(4n) means   [   ]

A) Expansion version of x(n)   B)Compression version of x(n)

    C) Delayed version of x(n)   D)none

27. Generally x(t-3) means   [   ]

    A) x(t) delayed by 3 units B) x(t) advanced by 3 units   C) both   D) None

28. y(n)=x(n)+x(n-1),system is memory or memory less   [   ]

    A) Memory   B) memory less   C) both   D) None

29.   Fourier series is used to analyze ---- signals   [   ]

    A) Periodic   B) non periodic   C) both   D) none

30.   For the existence of Fourier series, Dirichlet's conditions are   [   ]

    A) Necessary   B) Sufficient   C) Necessary and sufficient D) none

31.   The net areas of sinusoids over complete periods are   [   ]

    A) Finite   B)Infinite   C) Zero   D) none

32.   In the trigonometric Fourier series representation of a signal, a_0 is the   [   ]

    A) RMS value   B) Mean Square Value C) Peak Value   D) Average Value

33.   In the trigonometric Fourier series representation of an even function consists of [   ]

    A) Cosine terms   B) Sine terms   C) both sine and cosine   D) None

34.   The coefficient a_n is zero for ------------- functions   [   ]

    A) Even   B) Odd   C) both A and B   D) None

35.   In the trigonometric Fourier series representation of an ODD function consists of [ ]

    A) Cosine terms   B) Sine terms   C) both sine and cosine   D) None

36.   The coefficient b_n is zero for ------------- functions   [   ]

    A) Even   B) Odd   C) both A and B   D) None

37.   The mostly used Fourier series is   [   ]

    A) Trigonometric series   B) Exponential series   C) Cosine series   D) None

38.   The frequency spectrum of non periodic signal is   [   ]

    A) Continuous   B) Discrete   C) both continuous and discrete   D) None

39.   The time domain representation of a signal graphically is called   [   ]

    A) Waveform   B) Spectrum   C) Magnitude   D) None

40.   The frequency spectrum of a periodic signal is   [   ]

    A) Continuous   B) Discrete   C) both continuous and discrete   D) None

UNIT – II

FOURIER SERIES and FOURIER TRANSFORMS

1. The Fourier transform may be applied to   [   ]

   A) Aperiodic   B) Periodic   C) Both periodic & Aperiodic D) Neither periodic or periodic

2. The spectrum of triangular pulse is

   A) Gaussian function   B) Sinc function   C) $Sinc^2$ function D) Rectangular function

3. The Fourier transform of $CosW_0t$ is   [   ]

   A). $\pi[\delta(\omega + \omega_0) - \delta(\omega - \omega_0)]$ B). $j\pi[\delta(\omega + \omega_0) + \delta(\omega - \omega_0)]$

   C). $\pi[\delta(\omega + \omega_0) + \delta(\omega - \omega_0)]$ D). $j\pi[\delta(\omega + \omega_0) - \delta(\omega - \omega_0)]$

4. The Fourier transform of the exponential signal $e^{j\omega_0 t}$ is   **[AE 2006]**   [   ]

   A) a constant   (B) a rectangular gate (C) an impulse(D) a series of impulses

5. The Fourier transform of $SinW_0t$ is   [   ]

   A) $\pi[\delta(\omega + \omega_0) - \delta(\omega - \omega_0)]$ B) $j\pi[\delta(\omega + \omega_0) + \delta(\omega - \omega_0)]$

   C) $\pi[\delta(\omega + \omega_0) + \delta(\omega - \omega_0)]$ D) $j\pi[\delta(\omega + \omega_0) - \delta(\omega - \omega_0)]$

6. The Fourier transform of t x(t) is   [   ]

   A) $\frac{dX(j\omega)}{d\omega}$ B) $j\frac{dX(j\omega)}{d\omega}$ C) $\frac{X(j\omega)}{\omega}$ D) $\frac{jdX(j\omega)}{d\omega}$

7. The Fourier transform of $e^{-at}u(t)$ is **[GATE 2000]**   [   ]

   A) $\frac{1}{a-j\omega}$ B) $\frac{1}{a+j\omega}$ C) $\frac{1}{a^2+\omega^2}$ D) $\frac{1}{a^2-\omega^2}$

8. The Fourier transform for a function x(t) exists when   [   ]

   A) $\int_{\infty}^{\infty} f(t)dt = \infty$ B)$\int_{\infty}^{\infty}|f(t)|dt < \infty$ C) $\int_{\infty}^{\infty}|f(t)|dt = \infty$ D)$\int_{\infty}^{\infty} f(t)dt > \infty$

9. The Fourier transform of u(t) is   [   ]

   A) $\frac{1}{j\omega}$ B) $j\omega$ C) $\frac{1}{1+j\omega}$ D) $\pi\delta(\omega) + \frac{1}{j\omega}$

10. The Fourier transform of $e^{j\omega_0 t}x(t)$ is   [   ]

    A) $X(\omega + \omega_0)$ B) $X(\omega_0)$ C) $X(\omega - \omega_0)$ D) $X(\frac{\omega}{\omega_0})$

11. Parseval's identity states that $\int_{\infty}^{\infty}|f(t)|^2 dt =$ [   ]

    A). $\int_{\infty}^{\infty} X_1(\omega)X_2^*(\omega)d\omega$ B). $\frac{1}{2\pi}\int_{\infty}^{\infty} X_1(\omega)X_2^*(\omega)d\omega$

    C). $\frac{1}{2\pi}\int_{\infty}^{\infty} X_1^*(\omega)X_2^*(\omega)d\omega$ D). $2\pi\int_{\infty}^{\infty} X_1(\omega)X_2^*(\omega)d\omega$

12. The Fourier transform of $x^*(t)$ is   [   ]

A) $X^*(\omega)$ B) $X^*(-\omega)$ C) $-X^*(\omega)$ D) $-X^*(-\omega)$

13. The Fourier transform of $\frac{dx(t)}{dt}$ is   [   ]

     A) $\frac{d\omega}{\omega}X(\omega)$ B) $\frac{1}{\omega}X(\omega)$ C) $j\omega X(\omega)$ D) $\frac{j\omega}{X(\omega)}$

14. The Fourier transform of x(at)=   [   ]

     A) $\frac{1}{|a|}X\left(\frac{\omega}{a}\right)$ B) $\frac{1}{|a|}X(a\omega)$ C) $\frac{1}{|a|}X\left(\frac{a}{\omega}\right)$ D) $\frac{1}{|\omega|}X\left(\frac{\omega}{a}\right)$

15. The Fourier transform of a unit impulse function $\delta(t) is$ [   ]

     A)$1/\omega$ B) 1   C) ω D) $1/j\omega$

16. The Fourier transform of $\delta(t - t_0) is$ [   ]

     A) $e^{j\omega t_0}$ B) $e^{-j\omega t_0}$ C) e^{-jt_0} D) $\delta(t - t_0)$

17. The Fourier transform of $e^{-at}u(t)$ is   [   ]

     A) $\frac{1}{a^2+w^2}$ B) $\frac{1}{a-jw}$ C) $\frac{1}{a+jw}$ D) $\frac{1}{a^2-w^2}$

18. The Fourier transform of x(-t) is   [   ]

     A) X(ω)   B) X($-\omega$)   C) $X(\frac{1}{\omega})$ D) -X(ω)

19. The FT of $x_1(n)*x_2(n)$ is   [   ]

     A) X1(ω) X(ω)   B)X1(ω)X2(ω)   C)X1(ω) $*$ X2(ω)   D) Doesn't exits

20. The FT of $\delta(t) is$ [   ]

     A) 0   B)1   C) ∞ D) not defined

21. The F.T of d2/dt [x(t-2)] is   [   ]

     A) X(jω/2)/-ω^2 B) -ω^2X(jω/2)   C) X(jω) ej2ω D) -ω^2 e$^{-j2}\omega$x(jω)

22. The FT of x(n)*h(n) is   [   ]

     A)X(ω)H(ω)   B)X(ω)*H(ω)   C)X(ω)H($-\omega$)   D)X(ω)*H(-ω)

23. The FT of analog signal consists of a spectrum with frequency range   [   ]

     A)-π to π B) 0 to 2 π C)0 to ∞ D)- ∞ to ∞

24. The DTFT of x(n)= 2^nu(n) is   [   ]

     (A) $1/1 - 2e^{-j\Omega}$ (B) $e^{j\Omega}/1 - 2e^{-j\Omega}$ (C)$1/1 + 2e^{-j\Omega}$ (D) none

25. DTFT is a special case of   [   ]

     (A) Z- transform   (B) Laplace transform (C) continuous time F.T   (D) none

26. Z transform of x(n) is the DTFT of   [   ]

     (A) x(n)r-n   (B) x(n)rn   (C) x(n)u(n)   (D) x(n)r(n)

27. The F.T of u(t) is   [   ]

(A) $\pi\delta(\omega)$ (B) $1/j\omega$ (C) $1/j\omega$ (D) None

28. The inverse F.T of $j\omega/(1+1/j\omega)2$ is------------------------------------- [   ]

(A) $(t-1) e\text{-}t\ u(t)$ (B) $(1-t) e\text{-}t\ u(t)$ (C) $(1+t) e\text{-}t\ u(t)$ (D) $-(1+t) e\text{-}t\ u(t)$

29. The frequency response of LTI system is given by the FT of the ____of the system [   ]

A) transfer function   B)output   C)impulse function   D)input

30. The FT of $x(n)*h(n)$ [   ]

A) $X(\omega)H(\omega)$ B) $X(\omega)*H(\omega)$ C) $X(\omega)H(-\omega)$ D) $X(\omega)*H(-\omega)$

31. The FT of analog signal consists of a spectrum with frequency range [   ]

A) $-\pi$ to π B) 0 to 2π C) 0 to ∞ D) $-\infty$ to ∞

32. The FT of a discrete-time signal is unique in the range [   ]

A) $-\pi$ to π B) 0 to 2π C) 0 to ∞ D) $-\infty$ to ∞

33. The FT of $\delta(n) is$ [   ]

A) 0   B) 1   C) ∞ D) not defined

34. The FT of $u(n)$ [   ]

A) $1/1\text{-}e^{j\omega}$ B) $1/1\text{-}e^{-j\omega}$ C) $1/1\text{-}\omega$ D) $1/1\text{-}j\omega$

35. The FT of $a^n u(n)$ [   ]

A) $1/1\text{-}ae^{j\omega}$ B)$1/1\text{-}ae^{-j\omega}$ C)$1/1\text{-}ja\omega$ D)$1/1+aj\omega$

36. The FT of $-a^n u(-n\text{-}1)$ is [   ]

A) $1/1\text{-}ae^{j\omega}$ B)$1/1\text{-}ae^{-j\omega}$ C)$1/1\text{-}ja\omega$ D)$1/1+aj\omega$

37. The FT of $2^n u(n)$ is [   ]

A) $1/1\text{-}2e^{j\omega}$ B)$1/1\text{-}2e^{-j\omega}$ C) $1/1+2e^{j\omega}$ D) doesnot exists

38. The FT of $\delta(n+2) - \delta(n-2)$ is [   ]

A) $2j\ \sin2\omega$ B) $2\cos2\omega$ C) $\sin2\omega$ D) $\cos2\omega$

39. The FT of $x(n)\cos\omega_0 n$ is [   ]

A) $1/2\{X(\omega+\omega_0)+ X(\omega\text{-}\omega_0)\}$ B) $½\{X(\omega+\omega_0)+ X(\omega+\omega_0)\}$

C) $X(\omega)$ D) none

40. The FT of $x(-n)$ is [   ]

A) $X(\omega)$ B) $X(-\omega)$ C) $X(\omega+1)$ D) none

UNIT –III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS

1. The characteristics of an LTI system are completely characterized by its   [   ]

    A) Impulse response   B) step response   C) transfer function   D) none

2. For defining a transfer function, the initial conditions must be taken as   [   ]

    A) Zero   B) infinite   C) finite   D) none

3. The spectral density function of the input signal x(t) is given by   [   ]

    A) X(ω)   B) H(ω)   C) Y(ω)   D) X^2(ω)

4. A linear time invariant system with an impulse response h(t) produces output y(t) when an input x(t) is applied. When an input x(t-τ) is applied to a system with a impulse response h(t-τ),the output will be**(Gate-2009)**   [   ]

    A) Y(τ)   B) Y(2(t-τ))   C) Y(t-τ)   D) Y(t2τ)

5. The probability density function of the envelope of narrow band Gaussian noise is   [   ]

    A) Poisson   B) Gaussian   C) Rayleigh   D) Rician

6. The significance of PSD is   [   ]

    A) amplitude   B) frequency   C) unit band width   D) phase

7. The PSD of a real valued random process is   function of frequency   [   ]

    A) Even   B) odd   C) symmetric   D) unsymmetric

8. A linear system possesses the important property of   [   ]

    A) superposition   B) variation   C) constancy   D) none

9. A system whose behavior and characteristics of the system are fixed over time is called [   ]

    A) time variant   B) time invariant   C) linear   D) none

10. for distortion less transmission the magnitude H(w) is   [   ]

    A) Zero   B) Infinite   C) Constant   D) linear

11. A transmission is said to be__ if the response of the system is exact replica of the input signal

    A) noise less   B) distortion less   C) causal   D) none   [   ]

12. T[$\delta(n)$] =   [   ]

    A) h(n)   B) H(s)   C) H(n)   D)none

13. In time domain, a linear system is described in terms of its   [   ]

    A) unit step   B)ramp   C)impulse response   D)none

14. for distortion less transmission the phase must be   [   ]

    A) Zero   B) Infinite   C) Constant   D) linear

15. for distortion less system, the response must be_____ of the input signal   [   ]

    A) Exact replica   B) different   C) non-linear   D) none

16. In time variant system, if y(n)=H[x(n)] then y(n-k)=   [   ]

   A) H[x(n+k)]   B) h[x(n-k)]   C) h[x(n+k)]   D) none

17. _____ criterion is a test which distinguish between a physically realizable characteristics from

   an unrealizable   [   ]

   A) Paley wiener   B) drichlet's   C) Pascal's   D) none

18. $\int_{-\infty}^{\infty} |H(\omega)|^2 d\omega$ should be   [   ]

   A) >0   B)=0   C)<∞   D)none

19. For distortion transmission the system bandwidth must be equal to   [   ]

   A) Signal bandwidth B) infinite   C) ½ signal bandwidth   D) 2 times signal bandwidth

20. A system is defined by impulse response h(n)=2^n u(n-2).the system is**(Gate2011)** [   ]

   A) Linear   B) nonlinear   C) unstable   D) stable

21. y(n)= 3x(n+3)   [   ]

   A) Linear   B) nonlinear   C) both   D) None

22. ----   filter passes high frequency signals   [   ]

   A) Low pass   B) high pass   C) band pass   D) None

23. y(n)= k Δx(n), where Δx(n)= [x(n+1)-x(n)]   [   ]

   A) Linear   B) nonlinear   C) both   D) None

24. h (t)=e^{-2t}u(t-1)   [   ]

   A) Non causal   B) causal   C) both   D) None

25. h(t)=e^{-2t}u(t-1)   [   ]

   A) Stable   B) unstable   C) both   D) None

26. Rise time is_____ proportional to the cutoff frequency of the filter   [   ]

   A) directly   B)inversely   C) linearly   D)none

27. A signal is said to be causal if it is zero for   [   ]

   A) t=∞   B)t>0   C)t<0   D)none

28. The_____ of a system is arbitrarily defined as the interval of frequencies over which the

   magnitude |H(ω)| remains with in 1/$\sqrt{2}$ times its value at the midband   [   ]

   A) beam width   B) band width   C) pulse width   D) none

29. The signal distortion depends on the _____ of the system   [   ]

   A) beam width   B) band width   C) pulse width   D) none

30. In time variant system, if y(n)=H[x(n)] then y(n-k)=   [   ]

   A) H[x(n+k)]   B)h[x(n-k)]   C)h[x(n-k)]   D)none

31. ___criterion is tests which distinguish between a physically realizable characteristics from on unrealizable characteristics   [   ]

    A) Paley wiener   B)drichlet's   C)Pascal's   D) none

32. ---- filter passes low frequency signals   [   ]

    A) Low pass   B) high pass   C) band pass   D) None

33. ---- filter passes band of frequency signals   [   ]

    A) Low pass   B) high pass   C) band pass   D) None

34. An energy signal has G(f)=10.Its energy density spectrum is**(Gate-2011)**   [   ]

    A) 10   B)100   C)50   D)20

35. Which one is time invariant system?**(Gate-2013)**   [   ]

    A) y(n)=x(2n)   B) y(n)=x(n) x(n-1)   C) y(n)=x(n/2)   D) none

36. The function δ(t - b) is**(Gate-2010)**   [   ]

    A) An impulse function   B) a step function originating at t = b

    C) An impulse function originating at t = b   D) None

37. For distortion less transmission the amplitude response is   [   ]

    A) Zero   B) Infinite   C) Constant   D) linear

38. For distortion less transmission the phase response is   [   ]

    A) Zero   B) linear   C) Constant   D) linear

39. The output of an LTI system is equal to unit impulse when input is   [   ]

    A) $\delta(t)$]   B) u(t)   C) r(t)   D) all the above

40. For distortion transmission the bandwidth of the system is   [   ]

    A) Finite   B)infinite   C) zero   D)very small

UNIT-IV

CONVOLUTION AND CORRELATION OF SIGNALS

1. It is possible to compute the cross correlation Rxy(ŧ) between two signals x(t) and y(t) directly from their convolution provided [   ]

   A) x(t) has even symmetry   B) x(t) has odd symmetry

   C) y(t) has even symmetry   D) y(t) has odd symmetry

2. x(t)= 10π(t/4) and y(t)= [δ(t-1)+ δ(t-5)].then x(t)*y(t) is [   ]

   A) 10π((t-3)/4)   B) 10π((t-4)/4)   C) 10 [π((t-3)/4) + π((t-5)/4)] D) none

3. X(t)= 5π(t/4), the waveform of Rxx(ŧ) is [   ]

   A) Rectangular   B) triangular   C) trapezium   D) none

4. X(t)= 10π(t/10), Sxx(f) is [   ]

   A) a sinc function B) a triangular function C) a sinc square function D) a rectangular function

5. X(t)= 5π(t/10), the maximum value of Rxx(ŧ) is [   ]

   A) 250   B) 50   C) 500   D) 25

6. X(t)= 10π(t/10), the maximum value of Sxx(0) is [   ]

   A) 100   B) 1000   C) 500   D) 5000

7. X(t)= 10π(t/10), the total area under the Sxx(f) curve is [   ]

   A) 1000   B) 500   C) 100   D) 10000

8. The signal e-t u(t) is applied as input to an L-section RC low pass filter with time constant =1 The energy spectral density at the output of the filter at the 3-dB cutoff frequency of the filter is

   [   ]

   A) 1   B) 0.5   C) 0.25   D) 1.5

9. x(n)= {1,-1,2,-2 } Then rxx (0) is [   ]

   A) 0   B) 10   C) 12   D) 8

10. if x(n) is of finite duration and has N samples, rxx (k) wil have a duration of [   ]
    A) 2N samples   B) N2 samples   C) (2N-1) samples   D) (2N+1) samples

11. x(n)=2-n u(n). then rxx (0) is [   ]

    A) 1/3   B) 2/3   C) 1   D) 4/3

12. x(n)=(0.5)-n u(-n). then rxx (0) is [   ]

    A) 4/3   B) 1   C) 2/3   D) 1/3

13. FFT can be used for a computation of [   ]

A) linear convolution but not circular convolution B) circular convolution but not linear convolution C) both linear and circular convolutions   D) neither linear nor circular convolutions

14. If $r_{xy}(3)$=12 for x(n)= {4,-2,2,0,4} and y(n)= {3,0,-3,6}, what is $r_{xy}(2)$ if x(n)= {2,-1,1,0,2} and y(n)= {0.5,0,-0.5,1}   [   ]

A) 3   B) 2.5   C) 2   D) 1

15. x(n)= {2,-1,3,-2}. What is the value of $r_{xy}(0)$ [   ]

A) 2   B) 1.414   C) 18   D) 4

16. x(n)= {5,5,5,5,5} and y(n)= {20,20, 1.414,20,-30}. The upper bound for $| r_{xy}(k) |$is [   ]

A) 50   B) 500   C) 100

     D) 25

17. The total area under the PSD is equal to the--------------------- of the signal   [   ]

A) Average power   B) average energy   C) total energy   D) total power

18. The convolution of x(t) and h(t) is given by y(t)= $\int_o^t x(\tau)\, h(t-\tau)d\tau$, then   [   ]

A) Both x(t) and h(t) are causal   B) Both x(t) and h(t) are non-causal

C) x(t) causal and h(t) is non-causal   D) h(t) is causal and x(t) is non-causal

19. The convolution of x(t) and h(t) is given by y(t)= $\int_{-\infty}^{\infty} x(\tau)\, h(t-\tau)d\tau$, then   [   ]

A) Both x(t) and h(t) are causal   B) Both x(t) and h(t) are non-causal

C) x(t) causal and h(t) is non-causal   D) h(t) is causal and x(t) is non-causal

20. The convolution of x(t) and h(t) is given by y(t)= $\int_{-\infty}^{t} x(\tau)\, h(t-\tau)d\tau$, then   [   ]

A) Both x(t) and h(t) are causal   B) Both x(t) and h(t) are non-causal

C) x(t) causal and h(t) is non-causal   D) h(t) is causal and x(t) is non-causal

21. The convolution of x(t) and h(t) is given by y(t)= $\int_o^{\infty} x(\tau)\, h(t-\tau)d\tau$, then   [   ]

A) Both x(t) and h(t) are causal   B) Both x(t) and h(t) are non-causal

C) x(t) causal and h(t) is non-causal   D) h(t) is causal and x(t) is non-causal

22. The time convolution theorem states that F[x_1(t)*x_2(t)] =   [   ]

A) X_1(w)X_2(w)   B) X_1(w)*X_2(w)   C) $1/2\pi$ [X_1(w)X_2(w)]   D) $1/2\pi$ [X_1(w) *X_2(w)]

23. The frequency convolution theorem states that F[x_1(t) x_2(t)] =   [   ]

A) X_1(w)X_2(w)   B) X_1(w)*X_2(w)   C) $1/2\pi$ [X_1(w)X_2(w)]   D) $1/2\pi$ [X_1(w) *X_2(w)]

24. The autocorrelation function and PSD form a --------------pair

A) Fourier Transform B) Laplace Transform   C) Z- Transform   D) Fourier series

25. The condition for orthogonality of two functions $x_1(t)$ and $x_2(t)$ in terms of correlation is [   ]

A) $R_{12}(\tau) = \infty$ B) $R_{12}(\tau) = 0$ C) $R_{12}(\tau) = 1$

D) $R12(\tau) = finite$

26. The autocorrelation is maximum at   [   ]

A) $\tau = 0$ B) $\tau = \infty$ C) $\tau = 1$ D) $\tau = none$

27. The autocorrelation function and ESD form a --------------pair

A) Fourier Transform B) Laplace Transform   C) Z- Transform   D) Fourier series

28. The Fourier transform of the cross correlation of two signals $x_1(t)$ and $x_2(t)$ is equal to   [   ]

A) $X_1(w)X_2(w)$ B) $X_1(w)*X_2(w)$ C) $X_1^*(w) X_2^*(w)$ D) *none*

29. The cross correlation of $x_1(t)$ and $x_2(t)$ is the same as the convolution of   [   ]

A) $x_1(t)$ and $x_2(-t)$ B) $x_1(t)$ and $x_2(t)$ C) $x_1(-t)$ and $x_2(t)$ D) $x_1(-t)$ and $x_2(-t)$

30. The distribution of average power of the signal in frequency domain is called---------------

A) EDS   B) PDS   C) EDS and PDS   D) None

31. The total area under the EDS is equal to the-------------------- of the signal   [   ]

A) Average power   B) average energy   C) total energy   D) total power

32. The distribution of power or energy of a signal per unit bandwidth is called --------[   ]

A) EDS   B) PDS   C) EDS and PDS   D) None

33. The time convolution theorem states that   [   ]

A) $x1(t) * x1(t) =$ $X1(w)X2(w)$ B) $x1(t) * x1(t) = X1(w)*X2(w)$

C) $x1(t) * x1(t) =$ $1/2\pi [X1(w) *X2(w)]$ D) $x1(t) * x1(t) = 1/2\pi [X1(w)X2(w)]$

34. The autocorrelation function is maximum at --------   [   ]

A) Origin   B) Top   C) bottom   D) None

35. If $R_{xy}(0) = 0$ then the signals are   [   ]

A) Orthogonal   B) non orthogonal   C) both orthogonal and non-orthogonal   D) None

36. The convolution of signals with an impulse is equal to   [   ]

A) A signal itself   B) amplitude different C) time period different   D) None

37. The cross correlation of ------------------ signals is zero   [   ]

A) Orthogonal   B) non orthogonal   C) both orthogonal and non-orthogonal   D) None

38. The autocorrelation function at origin is equal to the------   [   ]

   A) Average power   B) average energy   C) total energy   D) total power

39. The distribution of energy of a signal in frequency domain is called-----------------------   [   ]

   A) EDS   B) PDS   C) EDS and PDS   D) None

40. Correlation of two signals is a measure of ------------- between those signals   [   ]

   A) difference   B) similarity   C) comparison   D) None

UNIT-V

LAPLACE TRANSFORM & Z-TRANSFORM

1. If x(t) and its d/dt are laplace transformable and the LT of x(t) is X(s) then $\lim_{t \to \infty} x(t)$

   is given by   [   ]

   A) $\lim_{s \to \infty} sX(s)$ B) $\lim_{s \to 0} sX(s)$ C) $\lim_{s \to \infty} X(s)/s$ D) $\lim_{s \to 0} X(s)/s$

2. What is the Laplace transform of a delayed unit impulse function $\delta(t-1)$____   [   ]

   A) 1   B) 0   C) e^{-s} D) s

3. What is the Laplace transform of $x(t) = e^{-2t}u(t) *tu(t)$ [   ]

   A) $-1/s^2(s+2)$ B) $-1/s^2(s-2)$ C) $1/s^2(s-2)$ D) $1/s(s-2)$

4. The output of a linear system to a unit step input u(t) is t^2e^t the system function H(s) is

   A) $2/s^2(s+2)$ B) $2/(s+2)^2$ C) $2/(s+2)^3$ D) $2s/(s+2)^3$ [   ]

5. Laplace transform of a $e^{-at} \sin\omega t$ is   [   ]

   A) $\omega/(s+a)^2+\omega^2$ B) $\omega/(s-a)^2+\omega^2$ C) $\omega/(s-a)^2- \omega^2$ D) $\omega/(s+a)^2- \omega^2$

6. The Impulse response of RL circuit is   [   ]

   A) Rising exp   B) Decaying exp   C) Step   D) Parabolic

7. The impulse response of a system is h(t). When the input is $\delta(t)$, the output y(t) will be

   A) y(t)   B) $\delta(t)$ C) h(t)   D) None   [   ]

8. The convolution of u(t)* u(t) is   [   ]

   A) $u^2(t)$ B) tu (t)   C) t^2u (t)   D) None

9. Laplace transform of d/dx x(t)   [   ]

   A) X(s)/s   B) X(s)   C) s/X(s)   D) X(s)

10. The unit step response of a system starting from rest is given by $c(t) = 1- e^{-2t}$ for t≥0 The transfer

    function is   [   ]

    A) 1/(1+2s)   B) 2/(s+2)   C) 1/(s+2)   D) 2s/(1+2s)

11. The transfer function of an LTI system is given by $H(s) = e^{-2s}$ .What is the impulse response of

    the system   [   ]

    A) $e^{-2t} u(t)$ B) u(t-2)   C) $\delta(t-2)$ D) $e^{2t} u(t)$

12. $X(s) = L[x(t)]$, then $L\{d^n/dt^n x(t)\}$ is   [   ]

    A) X(s)   B) $s^nX(s)$ C) $[X(s)]^n$ D) $d^n/ds^nX(s)$

13. Given $x(t) \leftrightarrow X(s)$ be a Laplace transform pair then the inverse Laplace transform of X(s+2j) is

    A) $e^{-j2t} x(t)$ B) $e^{-2t} x(t)$ C) $e^{2t} x(t)$ D) $e^{j2t} x(t)$ [   ]

14. Poles of the a Laplace transform are those complex points at which the transfer function will be

[   ]

A) 0   B) 1   C) ∞ D) None

15. The Z transform of conjugation x*(n) is   [   ]

A) $X^*(z^*)$ B) $X^*(z$ C) $X(z^*)$ D) None

16. The Z transform of multiplication of nx(n) is   [   ]

A) $z\, d/dz\, X(z)$ B) $-z\, d/dz\, X(z$ C) $-z \int X(z)$ D) $z \int X(z)$

17. The Z transform of time shifting of a x(n-m) is   [   ]

A) $z^m X(z)$ B) $z^m/X(z)$ C) $z^{-m} X(z)$ D) $z^{-m}/X(z)$

18. Z transform of time function $\sum_{k=0}^{\infty} \delta(n-k)$ is   [   ]

A) $(z-1)/z$ B) $z/(z-1)^2$ C) $z/(z-1)$ D) $(z-1)^2/z$

19. Z transform F(z)function of function $f(nT)= a^n T$ [   ]

A) $z/(z-a^T)$ B) $z/(z+a^T)$ C) $z/(z-a^{-T})$ D) $z/(z+a^{-T})$

20. The ROC of the Z transform of a unit step function   [   ]

A) $|z|>1$ B) $|z|<1$ C) $Re(Z)>0$ D) $Re(Z)<0$

21. If x(n) and X(z) are the Z transform pair, Z transform of $\sum_{k=-\infty}^{\infty} x(n-k)$ is   [   ]

A) $z^{-k} X(z)$ B) z^{-k} C) $\sum_{k=-\infty}^{\infty} z - kX(z)$ D) $\sum_{k=-\infty}^{\infty} z - k$

22. The only signal whose ROC is entire z-plane is   [   ]

A) $\delta(n)$ B) u(n)   C) r(n)   D) none

23. Unilateral Z transform of x(n) is equivalent to bilateral Z transform of   [   ]

A) x(n)u(n-1)   B) x(n)u(n)   C) $\delta(n)$ D) x(n-1)u(n-1)

24. DTFT is a special case of   [   ]

A) Z transform   B) Laplace transform   C) CTFT   D) None

25. ROC is defined as a range values of z for which X(z)   [   ]

A) Converges   B) Divergence   C) zero   D) Infinity

26. The ROC of a causal stable system must include the   [   ]

A) origin   B) Infinity   C) Ring   D) Unit circle

27. Z transform of x(n) is the DTFT of   [   ]

A) $x(n)r^{-n}$ B) $x(n)r^n$ C) x(n)u(n)   D) x(n)r(n)

28. The Z transform of the signal x(n-2) is   [   ]

A) $z^4/(z^2-16)$ B) $(z+2)^2/(z+2)^2-16$ C) $1/(z^2-16)$ D) $(z-2)^2/(z+2)^2-16$

29. If x(n) is right sided, X(z) has a signal pole and x(0)= 2, x(2)= ½ then x(n) is [   ]

   A) $u(-n)/2^{n-1}$ B) $u(n)/2^{n-1}$ C) $u(-n)/2^{n+1}$ D) $u(n)/2^{n+1}$

30. The Z transform $\delta(n)$ is [   ]

   A) -1   B) 0   C) 1   D) ∞

31. In the z-plane ROC of Z transform X(z) consist of [   ]

   A) Strips   B) Parabola   C) Rectangle   D) Ring

32. ROC does not contain any [   ]

   A) Poles   B) Zeros   C) Ones   D) None

33. Z transform of unit step sequence is [   ]

   A) $z/(z-1)$ B) $z/(z-1)^2$ C) $z/(z-1)$ D) $(z-1)^2/z$

34. Mapping $z= e^{st}$ from s-plane to z-plane is [   ]

   A) one to one   B) many to one   C) one to many   D) many to many

35. Z transform of time function $\sum_{k=0}^{\infty} \delta(n-k)$ is [   ]

   A) $(z-1)/z$ B) $z/(z-1)^2$ C) $z/(z-1)$ D) $(z-1)^2/z$

36. Z transform F(z)function of function $f(nT)= a^n T$ [   ]

   A) $z/(z-a^T)$ B) $z/(z+a^T)$ C) $z/(z-a^{-T})$ D) $z/(z+a^{-T})$

37. The ROC of the Z transform of a unit step function is [   ]

   A) $|z|>1$ B) $|z|<1$ C) $Re(Z)>0$ D) $Re(Z)<0$

38. If x(n) and X(z) are the Z transform pair , Z transform of $\sum_{k=-\infty}^{\infty} x(n-k)$ is [   ]

   A) $z^{-k}X(z)$ B) z^{-k} C) $\sum_{k=-\infty}^{\infty} z-kX(z)$ D) $\sum_{k=-\infty}^{\infty} z-k$

39. The Z transform of the signal x(n-2) is [   ]

   A) $z^4/(z^2-16)$ B) $(z+2)^2/(z+2)^2-16$ C) $1/(z^2-16)$ D) $(z-2)^2/(z+2)^2-16$

40. If x(n) is right sided, X(z) has a signal pole and x(0)= 2, x(2)= ½ then x(n) is [   ]

   A) $u(-n)/2^{n-1}$ B) $u(n)/2^{n-1}$ C) $u(-n)/2^{n+1}$ D) $u(n)/2^{n+1}$

Prepared by: C. **PRASAD**