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 **Reg. No. :**

**Question Paper Code: 44044**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Fourth Semester

Electronics and Communication Engineering

14UEC404- SIGNALS AND SYSTEM

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following is a periodic signal?

(a) x(t)=Au(t) (b) x(t)=Ae-jbt (c) x(t)=Aebt (d) x(t)=Aδ(t)

2. Which of the following is a stable system?

(a) y(t)=tx(t) (b) y(t)=t2x(t) (c) y(t)=etx(t) (d) y(t)=e-tx(t)

3. Fourier transform of Gaussian pulse will be

 (a) another Gaussian pulse (b) squared sinc pulse (c) sinc pulse (d) impulse train

4. Fourier transform of cosΩ0t is ,

 (a) x(Ω- Ω0)+x(Ω+Ω0) (b) π[δ(Ω- Ω0)+ δ(Ω+Ω0)] (c) 1/2x(Ω- Ω0)+1/2(Ω+Ω0) (d) π/2[x(Ω- Ω0)+x(Ω+Ω0)

5. If x(s) ,Y(s) & H(s) are laplace transform of input, output & impulse response of LTI

 continuous time system respectively then,

 (a) x(t)=L-1{H(s)/Y(s)} (b) x(t)= L-1{Y(s)/H(s)}

 (c) x(t)= L-1{1/Y(s)H(s)} (d) x(t)= L-1{Y(s)H(s)}

6. Given that H(s)=e-4s.What is the impulse response of the system?

 (a) δ(t-4) (b) u(t-4) (c) e-4tu(t) (d) e4tu(t)

7. A band limited continuous time signal with maximum frequency Fm, sampled at a

 frequency Fs, can be fully recovered from its samples provided that,

 (a) Fs≥2Fm (b) Fs=2Fm  (c) Fm≥2 Fs (d) Fs= Fm

8. The discrete time fourier transform of the signal, x(n)=0.5(n-1)u(n-1) is,

 (a) e-j⍵/1-0.5e-j⍵ (b) e-j⍵(1-0.5e-j⍵ ) (c) 0.5e-j⍵/1-0.5e-j⍵  (d) 0.5e j⍵/1-0.5e-j⍵

9. The Z-transform is a,

 (a) Finite series (b) Infinite power series

 (c) Geometric series (d) Both a & c

10. The Z-transform of correlation of the sequence x(n) & y(n) is,

(a) X\*(z)Y\*(Z-1) (b) X(z)Y(z-1) (c) X(z)\*Y(z) (d) X(z-1)Y(z-1)

PART - B (5 x 2 = 10 Marks)

11. Compare energy and power signals.

12. Find the Fourier series coefficients of continuous time signal COS(πt).

13. Find the inverse Laplace transform of X(s)=1/2[1/s + s/s2+4]

14. Define Sampling theorem.

15. Definition of Z-transform.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) A continuous time signal is defined as (8)

 x(t)=$\left\{\begin{array}{c}1, 0\leq t\leq 1\\-1 , 1\leq t\leq 2\end{array}\right.$

 Sketch the following (i) x(t-1) (ii) x(2t) (iii) x(t+3) (iv) x(t/3)

 (ii) Find the energy of a discrete time signal x(n)=(1/2)n for n≥0 and 3n for n<0 (8)

Or

 (b) Determine whether the following systems are static , causal, Time invariant , Linear

 (i) y(n)=x(4n+1) (ii) y(n)=x(n)+nx(n+1) (iii) y(n)=log10x(n) v.)y(n)=x2(n) (16)

17. (a) Determine the trigonometric form of the Fourier series of the ramp signal shown in

 Fig. (16)



Or

 (b) Determine the Fourier transform of following continuous time domain signals.

 (a)x(t)=e-atcosΩ0t u(t) (b)x(t)=t e-at u(t) (16)

18. (a) State and prove the

 (i)Initial value theorem

 (ii)Final value theorem of Laplace transform with the help of example. (16)

Or

 (b) Using Laplace transform determine the complete response of the system described by

 the equation, d2y(t)/dt2+5 dy(t)/dt+4y(t) = dx(t)/dt ; y(0)=0; dy(t)/dt |t=0 =1, for the

 input , x(t)=e-2t u(t). (16)

19. (a) A continuous time sinusoidal signal cos(2πFt+θ) is sampled at a rate

 Fs=1000Hz.Determine the resulting signal samples, if the input signal frequency

 F is 400 Hz, 600Hz & 1000Hz respectively. (16)

Or

(b) (i)Find the convolution of x(n)={1,2,3,4,5} & h(n)= {1,2,3,3,2,1} using multiplication method. (6)

 (ii)Find the Convolution sum of x(n)={1,2,3,4,5} & h(n)={1,2,3,3,2,1} using Tabulation method. (10)

20. (a) State and prove the following properties of Z transform (16)

 (i)Time shifting

 (ii)Convolution

 (iii) Differentiation in Time

 (iv) Differentiation in Frequency

 (16)

Or

(b) Determine the inverse Z-transform of the function , X(z)=3+2z-1+z-2/1-3z-1+2z-2 by following two methods i)power series expansion method ii)partial fraction expansion method. (16)