ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : OCTOBER 2009

REGULATIONS – 2007

FOURTH SEMESTER : ELECTRONICS AND COMMUNICATION ENGG.

070290013 - SIGNALS AND SYSTEMS

TIME : 3 Hours   Max.Marks : 100

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1.   Define signals and systems.

2.   Find the even and odd components of the signal $x(n)=\{-4,1,2,1,-3\}$

3.   What are the classification of systems?

4.   Check whether the following system are linear or nonlinear where $y(t)=\cos x(t)$.

5.   What are the dirichlet conditions of fourier series?

6.   State and proof time shifting property of fourier series.

7.   Find the fourier transform of the signal $x(t)=e^{-at}$

8.   State modulation property of fourier transform.

9.   What is the condition for convergence of the laplace transform?

10. State time convolution property of laplace transform

11. What are the four steps to compute convolution integral ?

12. What is the necessary and sufficient condition on the impulse response for stability ?

13. Define frequency response.

14. What is meant by signal flowgraph?

15. What are the drawbacks of transfer function method of representing a system?

16. Define state of a system.

17. Define roc and write any 4 properties of roc?

18. Define dft pair.

19. State intial and final value theorem in z transform.

20. What are the effects of aliasing?

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. a   Determine the power and RMS value of the signal   6

       (i) $x(t) = 5 \cos (50t + \Pi/3)$ (ii) $x(n)=10\sin 5n$

   b   Check whether the following system are stable,linear,causal,time – variant   6

       (i) $y(n)=\cos x(n)$ (ii) $y(n)=x(n)x(n-1)$

22. a   Find cosine fourier series of an halfwave rectified sine function   6

   b   State and proof parsevals theorem in laplace transform   6

23. a   What is meant by sampling theorem and derive it.   4

   b   Find the laplace transform for the damped sine wave signal $x(t)= e^{-at} \sin wot$ 8

24. a   State and proof rayleighs energy theorem in fourier series.   6

   b   If the system produces output $y(t) = e^{-t} u(t)$ for an input of $x(t)= e^{-2t}u(t)$. Determine its impulse response   6

25. a   Realize the transfer function of the system $H(S) = s^2+4s+2/s^2+5s+3$ in direct form I and II.   8

   b   Represent the following system using state space matrix of   4

       $d^3y(t)/dt^3+3d^2y(t)/dt^2+5dy(t)/dt+6y(t) = d^2x(t)/dt^2+6dx(t)/dt+5x(t)$

26. a State and proof periodicity property of DFT   4

    b Calculate 4 point DFT for the sequence $x(n)=\{1,2,3,4\}$ 8

27. a By using long division method determine inverse Z transform for the   6
       sequence $H(Z)=Z/Z^2-7Z+12$.

    b State and proof multiplication property in Z transform.   6

28. a Determine   the   forced   response   for   the   sequence   6
       $y(n)-1/4y(n-1)-1/8y(n-2)=x(n)+x(n-1)$ where $x(n)=(1/8)^n u(n)$,assume intial zero
       conditions.

    b Derive the derivation of System function from state model.   6

*****THE END*****