Question Paper Code: 34404

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Fourth Semester

Electronics and Communication Engineering

01UEC404 – SIGNALS AND SYSTEMS

(Regulation 2013)

Duration: Threehours   Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Define step signal.

2. Differentiate between deterministic and random signal.

3. State Dirichelt's condition.

4. Explain about Parseval's theorem.

5. State and prove the differentiation property of Laplace transform.

6. State the condition for stability.

7. Prove the time shifting property of discrete time Fourier transform.

8. What is aliasing?

9. What is the z-transform of $\delta(n+k)$?

10. List the advantages of the state variable representation of a system.

PART - B (5 x 16 = 80 Marks)

11. (a) Check whether the system $\frac{d^3y(t)}{dt^3} + 4\frac{d^2y(t)}{dt^2} + 5\frac{dy(t)}{dt} + 2y^2(t) = x(t)$ is linear   or non linear, causal or non-causal   and time invariant or time variant.   (16)

Or

(b) Explain the classification of signals in details. (16)

12. (a) Obtain the trigonometric Fourier series for the half wave rectified sine wave. (16)

Or

(b) (i) Prove the scaling and time shifting properties of Fourier transform. (8)

(ii) Find the Fourier transform of $f(t) = \sin(\omega_c t + \theta)$ (8)

13. (a) Realize the following system by direct form I, direct form II, cascade and parallel form $H(S) = S(S+2) \big/ (S+1)(S+3)(S+4)$. (16)

Or

(b) Determine the inverse Laplace transform of $F(s) = \dfrac{2s^2 + 3s + 3}{(s+1)(s+3)^3}$ and explain the state variable technique. (16)

14. (a) State and prove the time shift and frequency shift property of DTFT. (16)

Or

(b) State and explain sampling theorem and also explain the process of reconstruction of the signal from its samples. (16)

15. (a) Draw the block diagram for $H(z) = \dfrac{1+2z^{-1}+4z^{-2}}{1-z^{-1}+2z^{-2}}$ using Direct form I. (16)

Or

(b) Find the convolution sum between x(n) ={1,4,3,2} and h(n) ={1,3,2,1}. (16)

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