Reg. No. :

Question Paper Code: 31444

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

Fourth Semester

Electronics and Communication Engineering

01UEC404 – SIGNALS AND SYSTEMS

(Regulation 2013)

Duration: Three hours   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 and prove Parseval's theorem for Fourier transform.

4. Give synthesis and analysis equations of continuous time Fourier transform.

5. Define the region of convergence of the Laplace transform.

6. Define 'state' and 'state-variables'.

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. Find the system function for the difference equation $y(n) = 0.5y(n-1) + x(n)$.

PART - B (5 x 16 = 80 Marks)

11. (a) Sketch the following type of signals: (i) u(t-2), (ii) u(t-2), (iii) -3 u(t-2) and (iv) u(-t+1).   (16)

(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) Obtain the inverse Laplace transform of the function X(s) =1/(s^2+3s+2), ROC:-2<Re{s}<-1. (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) Find the impulse response and step response for the following system $Y(n) - 3/4\, y(n-1) + 1/8\, y(n-2) = x(n)$. (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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