Reg. No. : | | | | | | | | | | |

Question Paper Code: 54404

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Electronics and Communication Engineering

15UEC404- SIGNALS AND SYSTEMS

(Regulation 2015)

Duration: 1.15 hrs Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Time shifting property mathematically can be expressed as CO1- R

   (a) y(t) = x(t-T) (b) y(t) = x(t) (c) y(t) = x(t) +1 (d) y(t) = x(t) -1

2. Which of the following signal is causal signal? CO1- R

   (a) x(t) = A (b) x(t) = t (c) x(t) = u(t) (d) $x(t) = e^{-at}$

3. A periodic signal $x(t)\ of\ period\ T_0$ is given by $x(t) = \begin{cases} 1 & |t| < T_1 \\ 0 & T_1 < |t| < \frac{T_0}{2} \end{cases}$ CO2- R

   The dc component of (t) is

   (a) $\frac{T_1}{T_0}$ (b) $\frac{T_1}{2T_0}$ (c) $\frac{2T_1}{T_0}$ (d) $\frac{T_0}{T_1}$

4. Fourier series of any periodic signal x(t) can only be obtained if. CO2 -R

   (a) finite number of discontinuities within finite interval

   (b) finite number of positive and negative maxima

   (c) well defined at infinite number of points

   (d) both (a) and (b)

5. The inverse Laplace transform of CO3- R

$$\frac{-a}{s(s-a)}$$

(a) e^{at} (b)-e^{at} (c)1 - e^{at} (d)-1 + e^{at}

6. Find the initial value and final value of $\frac{1}{s(s+1)}$ CO3 -R

(a) 0 & 1 (b) 1 & 0 (c) 0 & 0 (d) 1 & 1

7. The F.T. of a conjugate symmetric function is always CO4- R

(a) Imaginary (b) Real (c) Conjugate unsymmetric (d) Conjugate symmetric

8. If the bandwidth of a bandpass signal x(t) is 2F, then the minimum sampling rate for bandpass signal must be, CO4-R

(a) 2F samples/sec (b) 4F samples/sec (c) F/2 samples/sec (d) F/4 samples/sec

9. The Region of Convergence(ROC) of the Z-transform of a unit step function is CO5- R

(a) $|z| < 1$ (b) (Real Part of Z) > 0 (c) (Real Part of Z) < 0 (d) $|z| > 1$

10. The factors that influence the choice of realization of structure is, CO5 -R

(a) memory requirement (b) computational complexity

(c) Parallel processing and pipelining (d) all the above

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Find the signal x(n) = $(1/3)^n$ u(n) is energy signal or not. CO1- U (8)

12. Find the Fourier series of the signal CO2- App (8)

$x(t) = \int_0^{2\pi} \sin 2\pi f_0 mt \ \cos 2\pi f_0 nt \ dt$

Where f_0 is the fundamental frequency and m and n are any positive integer

13. Explain and prove any five properties of Laplace transform CO3- Ana (8)

14. Find the frequency response of a I order system described by difference equation y(n) = a y(n-1) + x(n). Plot magnitude and phase response for a = 0.5. CO4- U (8)

15. List the properties of Z-transform and explain briefly. CO5- Ana (8)