Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Winter 2019 – 20 Examination

Semester: 3 **Date: 25/11/2019**
Subject Code: 03106201 / 203106201 **Time: 2:00pm to 4:30pm**
Subject Name: Fundamentals of Signals & Systems **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (Each of one mark) **(15)**

1. Speech signal is _____ signal. (Deterministic/ Random)
2. Sampling frequency $fs \geq$ _____ fm
3. Quantization is process to convert _____ signal in to Digital Signal.
4. $y(t) = x(-t)$ system is _____ (Casual/Non Casual)
5. Laplace transform of $\delta(t)$ Signal is _____.
6. Two signals having number of samples 5 & 6 respectively then how many samples are there in convolution of these two signals?_____
7. All Non-Casual systems are Dynamic and Vice –Versa its true? _____(Yes/No)
8. _____is equation of convolution for CT-LTI system.
9. Equation of CTFT $X(\omega) =$ _____
10. $u(t+2)$ signal start from t= _____
11. What is the value of $\text{sgn}(0)$, such that $\text{sgn}(n)$ is the Signum function?
    (A) 0 (B) 0.5 (C) 1.5 (D) 1
12. 1(one) is Z transform of _____
    (A) $\delta(n)$ (B) $\delta(t)$ (C) $\delta(s)$ (D) $\delta(z)$
13. A discrete signal is said to be even or symmetric if x(-n) is equal to
    (A)0 (B) $x(n)$ (C) $-x(n)$ (D) $-x(-n)$
14. What is full name of ROC in Z Transform_____.
    (A) Registrar of Companies(B)Region of Convergence
    (C) Real of Convergence (D) Region of Convolution
15. Which operation is amplitude scaling?
    (A) $2x(t)$ (B) $x(2t)$ (C) $x(t)$ (D) $x(-t)$

Q.2 Answer the following questions. (Attempt any three) **(15)**

(A) Check whether the following system is Static/Dynamic, Stable/Unstable, Linear /Non-Linear,Time-Invariant/Time-Variant& Causal/Non causal.

$$y(n) = \{x(n) + x(n-1) + x(n-2)\}$$

(B)Derive equation for Even and Odd part of signal $x(t)$.

(C)Find Convolution of given signal using Multiplication method

$x(n) = \{1,1,\underset{\uparrow}{0},1,1\}$

$h(n) = \{1,2,3,\underset{\uparrow}{4}\}$

(D)Solve differential equation using Laplace-transform.

$y'' - 6y' + 5y = 0$

$y(0) = 1$, $y'(0) = -3$

Q.3 (A) Find out Z-transform of following signal and also draw ROC. **(07)**

$x(n) = a^n u(n)$

(B) Draw signal $x(t) = r(t+1) - r(t) - r(t-2)$ **(08)**

OR

(B) Impulse Response of LTI system is given by **(08)**

$$h(t) = e^{-2t}; t \geq 0$$

With the help of convolution, find system output due to input:

$$x(t) = A; 0 \leq t \leq 2$$

Also sketch the output.

Q.4 (A)Using Tabulation Method Determine output of DT LTI system whose input and impulse response are given as **(07)**

$$x(n) = \frac{1}{3}n; \; for 0 \leq n \leq 6$$

$$h(n) = 1; \; for -2 \leq n \leq 2$$

OR

(A)Obtain CTFT of following signal and plot magnitude & Phase graph. **(07)**

$$x(t) = e^{-at}u(t)$$

(B)Draw and Explain Standard Test signal. **(08)**