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B.TECH (CSE, IT) IV SEMESTER

COURSE NAME: SIGNALS AND SYSTEMS — MAX. MARKS: 15
COURSE CODE: 10B11EC301 — MAX. TIME: 1 HR
COURSE CREDITS: 04

Note: Attempt all questions. Carrying of mobile phone in examination hall will be treated as unfair means.

Q1.(a) Determine whether or not each of the following signals is periodic. If the signal is periodic, determine its fundamental period:

(i) $x(t) = e^{(-1+j)t}$ (ii) $x[n] = 1 + e^{j\frac{4\pi n}{7}} - e^{j\frac{2\pi n}{5}}$ [2]

(b) Consider the discrete time signal $x[n] = 1 - \sum_{k=3}^{\infty} \delta[n-1-k]$. Determine the values of the integers M and n_0, so that $x[n]$ may be expressed as $x[n] = u[Mn - n_0]$. [3]

Q2. (a) Sketch the even and odd part of the signal
$x(t) = t[u(t) - u(t-1)] + (-t+2)[u(t-1) - u(t-2)]$. [3]

(b) Check the linearity and time-invariance properties for the following systems:
(i) $y(t) = x(t-2) + x(2-t)$
(ii) $y[n] = x[3n]$ [2]

Q3. Let $x(t) = u(t-3) - u(t-5)$ and $h(t) = e^{-3t}u(t)$. Compute
(a) $y(t) = x(t) * h(t)$,
(b) $g(t) = \frac{dx(t)}{dt} * h(t)$. [5]