

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
 TEST - 1 EXAMINATION- 2018
 B.Tech 4th Semester (CSE/ IT)

COURSE CODE: 10B11EC301

MAX. MARKS: 15

COURSE NAME: Signals & Systems

MAX. TIME: 1 HR

COURSE CREDITS: 04

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

- Q1. a) Determine whether or not each of the following signals is periodic. If periodic, find its fundamental period. [1+1] [CO1]

(i) $x(t) = \left[\cos \left(2t - \frac{\pi}{3} \right) \right]^2$ (ii) $x[n] = (-1)^{n^2}$

- b) Find power and energy of the following signals: [1+1] [CO1]

(i) $x(t) = e^{j\omega_0 t}$ (ii) $x[n] = 2u[n]$

- c) Sketch $x(4 - 2t)$ for the given signal $x(t)$. [1+1] [CO1]



- d) Find even and odd components of unit step signal. Label your sketches carefully. [1] [CO1]

- Q2. A system may or may not be (i) Causal (ii) Time invariant (iii) Stable. Determine which of these properties hold and which do not for each of the following systems. Justify your answers. [1.5+1.5] [CO2]

(i) $y(t) = \frac{dx(t)}{dt}$ (ii) $y[n] = \sum_{k=-\infty}^n x[k]$

- Q3. a) Determine the convolution of $x[n]$ and $h[n]$ using graphical method. [3] [CO2]

$$x[n] = \begin{cases} 1 & \text{for } -4 < n < 4 \\ 0 & \text{otherwise} \end{cases}$$

$$h[n] = \delta[n + 1] + 2\delta[n + 2]$$

- b) For the step input signal, evaluate the response of LTI system for following impulse responses: [1+1] [CO2]

(i) $h(t) = e^{-|t|}$ (ii) $h[n] = \delta[n] - \delta[n - 2]$