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Mid Semester Examination

Summer Semester June 2018

Course Code: 10B11EC301 | Course Name: Signals and Systems

Time: 2 Hours | Max. Marks: 50

Q1. Explain unit step, unit impulse and unit ramp functions in continuous time signals. [5]

Q2. Define periodicity and determine whether the following composite signals are periodic. Also determine their fundamental period.

(a) $x(t) = \cos(3\frac{\pi}{2}t) + 3\sin(\frac{\pi}{3}t)$

(b) $x[n] = \cos[5\frac{\pi}{2}n] + 6\sin[4\frac{\pi}{3}n]$ [10]

Q3. Explain energy and power signals. Determine whether following signals are energy signals or power signals and also determine their energy and power.

(a) $x(t) = e^{-j(2t+\frac{\pi}{4})}$ (b) $x[n] = (\frac{1}{2})^n u[n]$ [10]

Q4. Determine whether the following systems are linear, time invariant, dynamic, causal and stable. [10]

(a) $y[n] = x^2[n]$ (b) $y(t) = mx(t) + c$

Q5. Define LTI system. State and explain the causality and stability properties of LTI system in detail. [5]

Q6. Obtain the convolution of the following signals:

(a) $x(t) = e^{-2t}u(t),\ h(t) = u(t-3)$

(b) $x[n] = \{1\ 2\ 1\ 1\},\ h[n] = \{1\ 2\ 3\ 4\}$ [10]