Total No. of Questions : 4]

SEAT No. :

PF205

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APR-26/SE/Insem-251

S.E. (Electronics/E & TC/Electronics & Computer Engg./Electronics Engg. (VLSI Design & Technology)/Electronics & Communication(Adv. Comu. Tech.))

SIGNALS & SYSTEMS

(2019 Pattern) (Semester-IV) (204191) (Insem)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) *Answer Q.1 or Q.2 and Q.3 or Q.4.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Use of electronic pocket calculator is allowed.*
5) *Assume suitable data if necessary.*

Q1) a) Determine whether the signal is periodic, if it is periodic, find its period: determine fundamental period. **[5]**

$x(t) = 2\cos 100\pi t + 5\sin 50\ t$

b) Find Even and Odd components of the following signal. **[5]**

$x(t) = \cos(t) + \sin(t) + \sin(t)\cos(t)$

c) Determine whether the system described by $y(t) = 10\ x(t) + 5$ **[5]**

i) Memory less

ii) Time invariant

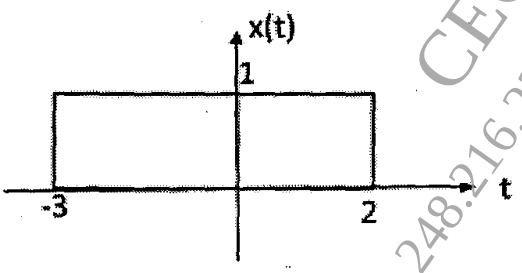
iii) Linear

iv) Causal

v) Stable

OR

Q2) a) For the signal shown in fig $x(t)$, perform the operation and draw $x(-t-2)$. **[6]**



P.T.O.

b) Determine the following signal is Energy or Power signal & find the corresponding energy/power **[5]**

$$x(t) = e^{-5t}\, u(t)$$

c) Evaluate the following integral using the property of impulse signal. **[4]**

$$\int_{-\infty}^{+\infty} e^{-5t^2}\, \delta(t-4)\, dt$$

Q3) a) Compute the convolution integral by graphical method and sketch the output for the following signal. **[6]**

$x(t) = u(t + 1)$ and $h(t) = u(t - 2)$

b) An LTI system has impulse response $h(t) = u(t + 1)$. **[4]**

Determine whether the system is causal, stable and memoryless.

c) State and prove properties of convolution integral. **[5]**

OR

Q4) a) Compute the convolution sum of following sequence using graphical method. **[6]**

$x[n] = \{1, 2, 1, 2\}$ and $h[n] = \{1, 1, 1\}$

b) Determine the Step response of the following system whose impulse response is $h(t) = e^{-5t}\, u(t)$. **[4]**

c) Consider the interconnections of the systems as shown in fig. Let the impulse response be specified as **[5]**

$h_1(t) = \delta(t)$, $h_2(t) = \delta(t-1)$, $h_3(t) = \delta(t+1)$, $h_4(t) = u(t)$

Obtain the overall impulse response of the system