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BIEL-007

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B.Tech. ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

June, 2013

BIEL-007 : SIGNALS AND SYSTEMS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any seven** questions. Use of Scientific calculator is **allowed**.*

1. (a) Show that a system described by the following equation is for time varying Parameter system. **2x5=10**

$$y(t) = (\sin t)\, x\,(t - 2)$$

(b) What is the total energy of the rectangular pulse shown in fig (i) ?

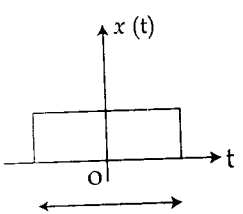
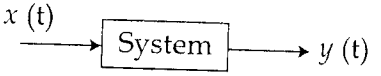


Fig. (i)

2. Consider the system shown in fig (ii) **10**



$y(t) = x^2(t - t_0) + 2$

Fig. (ii)

Determine whether the system is :

(a) linear

(b) stable and

(c) causal.

Justify your answer.

3. For a continuous LTI system with the impulse response **10**
$h(t) = 6e^{-t}(ut)$, determine the system response to the i/P 2u (t).

4. (a) Determine the particular solution of the difference equation **5**
$y[n] - 2y[n-1] + 3y[n-2] = x[n]$
where $x[n] = 3^n$, $n > 0$

(b) Consider the RL circuit shown in fig (iii), find the differential equation relating the output voltage y (t) across R and the input voltage $x(t)$ **5**

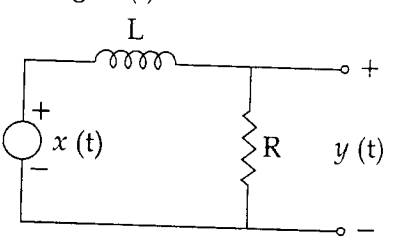


Fig. (iii)

5. Determine DFT of the sequence

(a) $x[n] = \begin{cases} 1/4 & 0 \le n \le 2 \\ 0 & \text{otherwise} \end{cases}$ 5

(b) Determine the fourier transform of the signal $x(t) = t \cos At$ 5

6. Find the trignometric fourier series of the waveform shown in fig (iv) 10

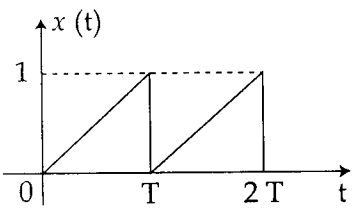


Fig. (iv)

7. Fig (v) shows a Lowpass RC network. Find the output if the input signal is $x(t) = e^{-t/RC}$ 10

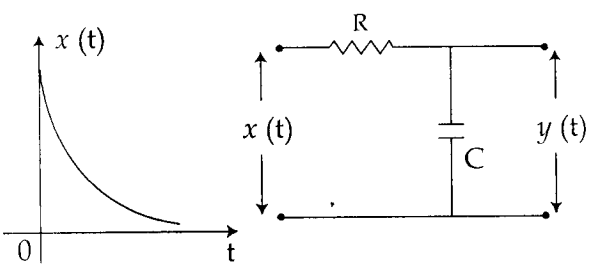


Fig. (v)

8. Determine the inverse z transform of 10

$$s[z] = \frac{2}{2 - 3z^{-1} + z^{-2}} \text{ when ROC : } |z| < 1/2$$

9. Find the system function H(z) and unit sample response h(n) of the system whose difference equation is given by **10**

$$y[\,n\,] = \frac{1}{2}\, y\,[\,n-1\,] + 2\, x\,[\,n\,]$$

The y[n] and $x\,[\,n\,]$ are output and input respectively.

10. Write short notes on *any two* : **2x5=10**

(a) Properties of z transform

(b) Properties of fourier transform

(c) Basic operations on signal.