No. of Printed Pages : 3

BIEL-007

B.Tech. ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

December, 2013

BIEL-007 : SIGNALS AND SYSTEMS

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt **any seven** questions.*

*(ii) Use of Scientific calculator is **allowed**.*

1. (a) Function $x(t)$ is shown in fig (i). Draw even and odd parts of $x(t)$. **5**

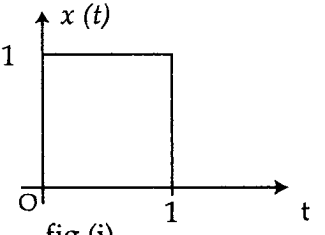

fig (i)

(b) What is the average power of square wave shown in fig (ii) ? **5**

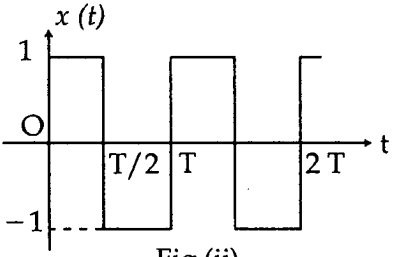

Fig (ii)

2. (a) Show that a system with excitation $x(t)$ and response $y(t)$, described by $y(t) = x\left(\frac{t}{2}\right)$ is linear, time varient and non-causal. 5

(b) Test the following system for stability 5

$$y[n]=\sum_{k=-\infty}^{n+1} x(k)$$

3. For an LTI system with unit impulse response $h(t)=e^{-2t}u(t)$ determine the response $y(t)$ for the input, $x(t)=e^{-t}u(t)$. 10

4. Determine the homogeneous solution of second order equation given by $y[n]-y[n-1]-y[n-2]=0$, with the initial condition, $y[0]=0, y[1]=1$. 10

5. (a) Determine the Fourier transform of the signal $x(t)$ shown in fig (iii) 5

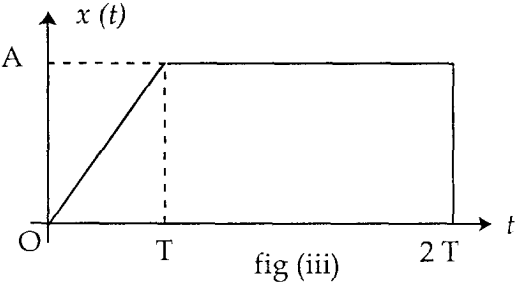

fig (iii)

(b) Find the DTFT of the following finite duration sequence of Length L. 5

$$x[n]=\begin{cases} A & \text{for } 0 \le n \le L-1 \\ 0 & \text{otherwise} \end{cases}$$

6. Obtain the trignometric Fourier series representation of the given periodic rectangular waveform in fig (iv) **10**

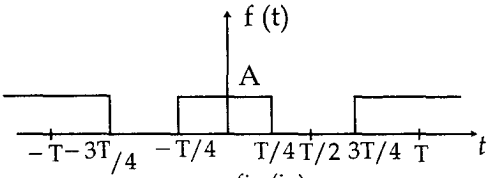

fig (iv)

7. The input voltage to an RC circuit is given as **10**

$x(t)=te^{-t/RC}.u(t)$ and the impulse response of this circuit is given as $h(t)=\frac{1}{RC}e^{-t/RC}.u(t)$.

Determine output $y(t)$.

8. Determine the inverse z-transform of **10**

$S[z]=\frac{2}{2-3z^{-1}+z^{-2}}$ when ROC : $|z|>1$.

9. Find the transfer function and impulse response of a discrete time LTI system described by linear constant-coefficient difference equation given by **10**

$$y[n]=\frac{1}{2}y[n-1]+x[n]+\frac{1}{3}x[n-1]$$

10. Write short notes on ***any two*** : **2x5=10**
    (a) Properties of Fourier series
    (b) Properties of Linear time invarient system
    (c) Region of convergence for z-transform