

**B.Tech. – VIEP – ELECTRONICS AND  
COMMUNICATION ENGINEERING (BTECVI)**

**Term-End Examination  
December, 2015**

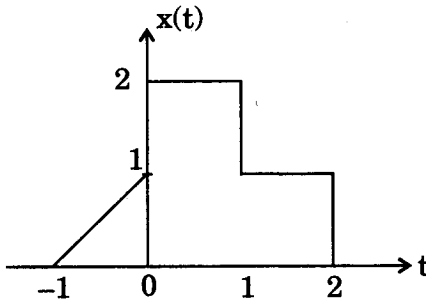
**BIEL-007 : SIGNALS AND SYSTEMS**

*Time : 3 hours*

*Maximum Marks : 70*

**Note :** *Attempt any seven questions.*

1. (a) For the signal  $x(t)$  shown in Figure 1, find the signals  $x(2t + 3)$  and  $x(-t + 1)$ . 5



*Figure 1*

- (b) Define periodic signal, odd signal and even signal with an example of each. 5

2. Check whether the following system is

- (a) static,
- (b) linear,
- (c) causal, and
- (d) time invariant.

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$$y(t) \frac{d^2 y(t)}{dt^2} + 3t \frac{dy(t)}{dt} + y(t) = x(t)$$

3. Determine the natural response of the system described by the following difference equation :

$$y(n) + \frac{3}{4} y(n-1) + \frac{1}{8} y(n-2) = x(n) + x(n-1)$$

Given :  $y(-1) = 0$ ;  $y(-2) = 1$ .

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4. Find the convolution of the given signals :

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$$x(n) = u(n); h(n) = u(n-3)$$

5. Find the Fourier series for the periodic signal

$x(t) = t, 0 \leq t \leq 1$  and repeats every 1 sec.

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6. Find the Fourier transform of

$$x(t) = e^{-|t|} \text{ for } -1 \leq t < 1$$

= 0 otherwise.

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7. (a) Discuss the properties of Discrete Fourier transform. 5
- (b) Determine the signal that corresponds to this Fourier transform : 5

$$x(e^{j\omega}) = e^{-j\omega} [ 0.5 + 0.5 \cos \omega ]$$

8. Using long division, determine the inverse Z-transform of  $x(z) = \frac{1 + 2z^{-1}}{1 - 2z^{-1} + z^{-2}}$ , if

- (a)  $x(n)$  is causal,
- (b)  $x(n)$  is non-causal. 10

9. Find the Z-transform and ROC of the following signal : 10

$$x[n] = [ 3(3)^n - 4(2)^n ] u[n].$$

10. Write short notes on any *two* of the following :  $2 \times 5 = 10$

- (a) Relation between Fourier transform and Z-transform
- (b) Different types of operations on signals
- (c) ROC in Z-transform