



Reg. No. : .....

Name : .....

**Sixth Semester B.Tech. Degree Examination, June 2015**  
**(2008 Scheme)**  
**08.604 : DIGITAL SIGNAL PROCESSING (R)**

Time : 3 Hours

Max. Marks : 100

**PART – A**

Answer **all** questions. **Each** question carries **4** marks.

1. Distinguish between discrete signal and digital signal.
2. Define convolution sum. What is its importance ?
3. Distinguish between causal and non causal system. Give one example each.
4. Give an example each for an FIR system and IIR system.
5. Explain time domain aliasing of DFT.
6. Explain the significance of ROC for Z transform.
7. Compare the time complexity for evaluation of DFT + FFT.
8. Sketch the signal flow graph for  $x_1 = t_{11} x_1 + t_{12} x_2 + t_{13} x_3$ .
9. Sketch the block diagram representation of first order system.
10. Name the different filter structures for FIR system. **(10×4=40 Marks)**



**PART – B**

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

**Module – I**

11. a) Determine whether the system described by the following input-output equations is linear or nonlinear.

i)  $y(n) = x(n) + \frac{1}{x(n-1)}$

ii)  $y(n) = x^2(n)$

iii)  $y(n) = n x(n)$



b) Determine whether the following systems are time invariant or not

i)  $y(n) = x(n) + x(n - 1)$

ii)  $y(n) = x(-n)$

12. Describe the steps for calculation of convolution sum. Calculate the convolution sum of two sequences  $x(n) = \{3, 2, 1, 2\}$   $h(n) = \{1, 2, 1, 2\}$

### Module – II

13. State and prove any three properties of DFT.

14. Find the DFT of a sequence  $x(n) = \{1, 1, 0, 0\}$  and the IDFT of  $g(k) = \{1, 0, 1, 0\}$ .

### Module – III

15. Explain different structures of IIR filters.

16. For the system  $H(z) = \frac{1}{2} + \frac{1}{4}z^{-1} + \frac{1}{4}z^{-2} + \frac{1}{2}z^{-3}$

a) Sketch the direct-form realization.

b) Sketch the cascade realization.

(3×20=60 Marks)