

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No. : 31503

**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. (I.T.) III Year I-Semester (Main) Examinations, Nov./Dec.-2016**

**Digital Signal Processing**

Time: 3 hours

Max. Marks: 70

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

**Part-A (10 × 2 = 20 Marks)**

1. How do you classify discrete time signals?
2. Relate DFT with other transforms.
3. State the condition for a filter to have constant group delay in terms of Impulse response.
4. Explain various structures for the realization of FIR filters.
5. What is Gibbs phenomena?
6. Distinguish between Butterworth and Chebyshev filters.
7. What is the significance of Barrel shifter?
8. Explain data addressing modes of DSP programmable devices.
9. How a PPM signal is used for encoding biometric signals?
10. What is a vocoder? Why it is needed?

**Part-B (5 × 10 = 50 Marks)**

11. a) Explain the properties of DFT in detail. [5]  
b) Compute 8 point DFT of the sequence  $x(n) = \{1, 2, 1, 2, 1, 3, 1, 3\}$  using radix-2 DIT FFT. [5]
12. a) Derive a condition for FIR filters to have constant phase and group delay. [5]  
b) Design FIR filter using Rectangular window for  $N = 11$  having frequency Response [5]  
 $H(e^{j\omega}) = j$  for  $-\pi \leq \omega \leq 0$   
 $= -j$  for  $0 \leq \omega \leq \pi$
13. a) Explain warping effect. [3]  
b) Design a chebyshev filter with a maximum pass band attenuation of 2.5db at  $\Omega_p = 20$  rad/sec [7]  
and stop band attenuation of 30db at  $\Omega_s = 50$  rad/sec.
14. a) Explain DSP computational building blocks. [5]  
b) Explain bus architecture of DSP programmable devices. [5]
15. a) Draw the model of speech generating system and explain. [5]  
b) Explain the block diagram of clipping autocorrelation pitch detector. [5]
16. a) The discrete time system  $y(n) = \alpha \cdot x(-n)$ . where  $\alpha$  is a non-zero constant. Determine whether [6]  
system is i) linear ii) time invariant.  
b) What are the desirable characteristics of a window? Why it is necessary for FIR filter [4]  
design?
17. Write short notes on any *two* of the following:  
a) Impulse Invariance method [5]  
b) Pipelining in DSP processor. [5]  
c) JPEG algorithm. [5]

\*\*\*\*\*