

**B.TECH. SEM -VI ( COMPUTER) 2014 COURSE (CBCS) :  
SUMMER - 2018**

**SUBJECT : DIGITAL SIGNAL PROCESSING**

Day : **Wednesday**  
Date : **06/06/2018**

**S-2018-2407**

Time : **02.30 PM TO 05.30 PM**  
Max. Marks : 60

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.

**Q.1** Determine whether following systems are static, causal, linear, time invariant (10) and stable.

- i)  $y(n) = ax(n) + 2$
- ii)  $y(n) = x(n+1) + nx(n)$

**OR**

Determine linear convolution of following using graphical method.  
 $x(n) = \{1, 2, 1, 2\}$   $h(n) = \{1, 1, 1, 1\}$

**Q.2** What is circular convolution property of DFT? Determine circular convolution (10) of following sequences using graphical method.

$$x(n) = \{0, 1, 2, 3\} \quad h(n) = \{2, 1, 1, 2\}$$

**OR**

What is twiddle factor? State the properties of twiddle factor. Draw the signal flow graph for 2 point DFT using Radix -2 DIT FFT algorithm.

**Q.3** A causal system has difference equation given by (10)

$$y(n] = 0.5 y(n-1) - 0.25 y(n-2) + x(n)$$

What is ROC of transfer function of system?

**OR**

How the characteristic behavior of casual discrete time signal depends on pole-zero location w.r.t unit circle? Explain with examples.

**Q.4** Obtain direct form I and II structure for (10)

$$H(z) = \frac{3z^2 - 4}{2z^2 - 2z + 1}$$

**OR**

Explain direct form and cascade form of FIR filter structure. Draw the filter structure for length M= 5 and order 4.

**Q.5** Compare FIR and IIR filters. Using impulse variance method design IIR filter (10) for

$$H(s) = \frac{2}{s+2}; F_s = 1000 \text{ samples/sec.}$$

**OR**

Explain windowing method to design FIR filter. Which window functions are called generalized windows?

**Q.6** Discuss up sampler and down sampler with respect to multirate signal (10) processing.

**OR**

Describe speech recognition and speech synthesis system with neat block diagram.

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