

**B. TECH. SEM -VI (E & TC ENGG.) (2014 COURSE) (CBCS)
: WINTER - 2017**

SUBJECT: DIGITAL SIGNAL PROCESSING

Day: **Monday**
Date: **20/11/2017**

W-2017-2245

Time: **10.00 AM TO 01.00 PM**
Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of non-programmable scientific **CALCULATOR** is allowed.

Q.1 What are the limitations of digital signal processing? State clearly with justification. (10)

OR

Determine the magnitude and phase of $H(\omega)$ for the system described by (10)
$$y(n) = \frac{1}{3}[x(n+1) + x(n) + x(n-1)]$$
 and plot the two functions for $0 \leq \omega \leq \pi$

Q.2 Find the circular convolution the following two sequences (10)

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

↑

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

↑

OR

Find the discrete Fourier transform of a sequence (10)

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

↑

Q.3 How is linear phase response obtained in FIR filter design? Give reasons for your answer. (10)

OR

Find impulse response $h(n)$ for a symmetric FIR filter of length $M=4$ with (10)
frequency response function specified as $H_r(0) = 1$ and $H_r\left(\frac{\pi}{2}\right) = \frac{1}{2\sqrt{2}}$.

Q.4 In the approximation of derivative method, why it is not possible to transform a high pass analog filter into high pass digital filter? (10)

OR

Convert the analog filter with system function (10)

$$H(s) = \frac{s + 0.1}{(s + 0.1)^2 + 16}$$

into a digital filter by means of impulse invariance method.

Q.5 What are the spectral characteristics of the quantization errors in the DSP systems? (10)

OR

What measures can be taken to prevent the occurrence of overflow oscillations? (10)

Q.6 Justify the use of Harvard or modified Harvard architecture in the DSP processors. (10)

OR

What are the advantages of digital implementation of DTMF? (10)