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Seat No.	

T.E. (Electronics and Telecommunication) (Part-II) (Semester -VI)

(Old) Examination, April - 2016

DIGITAL SIGNAL PROCESSING

Sub. Code: 45692

Day and Date : Saturday, 16 - 04 - 2016 **Total Marks : 100**

Time :3.00 p.m. to 6.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Figures to right indicate full marks.**
3) **Assume suitable data if necessary and state it clearly.**

SECTION-I

Q1) Attempt any two of the following: **[18]**

a) Explain how DFT can be used as linear transformation?

b) By using DFT and IDFT, determine the response of FIR filter with impulse response h(n) = {1, 2, 3} to the input sequence x(n) = {1, 2, 2, 1}.

c) Determine the IDFT of X(k) = {3,(2 + j), 1, (2 - j)}

Q2) Attempt any two of the following: **[16]**

a) What is Sectioned Convolution? Explain in detail Overlap add method?

b) Design a high-pass digital FIR filter using Kaiser window satisfying the specifications given below passband cut-off frequency, f_p = 3200Hz, stopband cut-off frequency, f_s = 1600Hz, passband ripple, Ap = .01 dB, stopband attenuation, As = 40dB and sampling frequency, F = 10000Hz.

c) An FIP filter has the unit impulse response sequence h(n) = {2, 2, 1}. Determine the output sequence in response to the input sequence x(n) = {3, 0, -2, 0, 2, -2, -1} using overlap-add convolution?

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Q3) Attempt any two of the following: **[16]**

a) Determine H(z) using impulse invariance method for analog system function $H(s) = 1/(s + 0.5)(s^2 + 0.5s + 2)$.

b) Compare IIR and FIR filters.

c) Realize the filter given by the transfer function $H(z) = (1 + 3z^{-1})/(1 - 2z^{-1})(1 + z^{-1} - 4z^{-2})$ using direct form-1 realization.

SECTION-II

Q4) Attempt any two of the following: **[16]**

a) Explain LMS algorithm. What are its practical limitations?

b) Explain Bi-linear transformation method of IIR filter design.

c) Explain application of adaptive filter as Noise Canceller.

Q5) Attempt any two of the following: **[16]**

a) Write a short note on applications of Wavelet Transform.

b) Define CWT & Inverse CWT? Explain any four properties of CWT?

c) Explain DCT as an orthogonal transform?

Q6) Attempt any two of the following: **[18]**

a) What are the different types of 'filters' used in the applications of digital signal processing?

b) What is sub-band coding? Explain with an example the sub-band coding process?

c) What is need of short time spectral analysis? Explain in detail the short time Fourier analysis for speech signals.

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