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FACULTY OF ENGINEERING & TECHNOLOGY

B.E(ECT/E&C)Year Examination June– 2015

Applied Digital Signal Processing

(Revised)

[Time: Three *Hours*] **[Max. Marks: 80]**

"Please check whether you have got the right question paper."

i) Question no.1 & 6 are compulsory
ii) Solve <u>any two</u> questions from Q 2 to Q 5.
iii) Solve <u>any two</u> questions from Q.7 to Q.10
iv) Assume suitable data, if necessary & state it clearly.

SECTION A

Q.1 Attempt <u>any two</u> from the following 10

a) What is decimation? Why is on anti-aliasing filter required?
b) What is polyphone decomposition? If M is not on integral multiple of I, How can you divide a larger length filter in to polyphone filter?
c) Explain in brief what is the need of adaptive filters?
d) What is the optimality criteria used in determination of the optimum filters .Also explain in brief the importance of linear prediction in the importance of linear prediction in digital signal processing?

Q.2 a) The signal x(n)is defined by 08

$$x(n) = \begin{cases} a^n & , N > 0 \\ O & , otherwise \end{cases}$$

i) Obtain the decimated signal with a factor of D=3
ii) Obtain the interpolated signal with a factor of I =3

b) What are the characteristics of polyphase filters? How are the polyphase structures reticent? 07

Q.3 a) Explain how noise introduced in the system can be cancelled using adaptive filters. 07
b) Explain in detail the L.M.S adaptive algorithm. 08

Q.4 a) Explain the AR, MA AND ARMA models Why is the AR model widely used. 08
b) Explain forward linear prediction scheme in detail. 07

Q.5 Write short notes on (<u>any two</u>) 15

a) Quadrature mirror filter bark
b) Sampling rate conversion by non-integer factors
c) RLS algorithm
d) Lattice structures

SECTION-B

Q.6 Attempt any two from the following 10

a) Define periodogram. List the various non-parametric methods of power spectrum estimation.
b) What is a random signal? Write any two examples.
c) Compare Von Neumann and Harvard architecture.
d) What is a circular buffering? Explain in brief.

Q.7 a) Give the estimate of autocorrelation function and power density for random signal. 08
b) Explain the Bartlett method of power spectrum estimation. 07

Q.8 a) Explain in brief on various on-chip peripherals of TMS320c 54XX processors. 08
b) Explain the VLSI architecture of DSP algorithm 07

Q.9 a) What is role of adaptive filters in biomedical signal processing? Explain in brief fetal ECG Monitory system. 08
b) Explain application of DSP on audio system. 07

Q.10 Write short notes on (any three) 15

a) DT random signals
b) SHARC processor
c) Welch method of power spectrum estimation.
d) Application of DSP in communication