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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
07 THRISSUR CLUSTER

THIRD SEMESTER M.TECH. DEGREE EXAMINATION DEC 2017

Electronics & Communication Engineering
Communication Engineering & Signal Processing

07EC6207 ADVANCED DIGITAL SIGNAL PROCESSING

Time : 3 hours

Max.Marks: 60

Answer all six questions. Part 'a' of each question is compulsory.

Answer either part 'b' or part 'c' of each question

Q.no.	Module 1	Marks
1a	Explain the applications of median filters	4

Answer b or c

- | | | |
|---|--|---|
| b | Explain impulse invariance technique of IIR filter design | 5 |
| c | Design a digital Butterworth filter satisfying given constraints using bilinear transformation | 5 |

$$0.707 \leq |H(e^{j\omega})| \leq 1 \text{ for } 0 \leq \omega \leq \pi/2$$
$$|H(e^{j\omega})| \leq 0.2 \text{ for } 3\pi/4 \leq \omega \leq \pi$$

Q.no.	Module 2	Marks
2a	Explain fractional sampling rate conversion	4

Answer b or c

- | | | |
|---|--|---|
| b | Explain polyphase implementation of digital filter banks | 5 |
| c | Explain polyphase representation of multirate filters | 5 |

Q.no.	Module 3	Marks
3a	Determine reflection coefficients $\{K_m\}$ of the lattice filter corresponding to FIR filter described by system function $H(Z) = 1 + 2Z^{-1} + (1/3)Z^{-2}$	4

Answer b or c

- | | | |
|---|---|---|
| b | Explain direct form and lattice form realizations of forward linear predictor | 5 |
| c | Explain optimum filter design for backward linear predictor. | 5 |

Q.no.	Module 4	Marks
4a	Explain whitening and orthogonality properties of prediction error	4

Answer b or c

- | | | |
|----------|---|----------|
| b | Describe Levinson Durbin algorithm in detail. | 5 |
| c | Find the expression for reflection coefficients using Schur algorithm | 5 |

Q.no.	Module 5	Marks
5a	Explain the computation of energy density spectrum. Also explain the use of DFT in power spectrum estimation	5

Answer b or c

- | | | |
|----------|--|----------|
| b | Describe Bartlett method for power spectrum estimation | 7 |
| c | Explain the performance characteristics and computational requirements of non parametric powers pectrum estimators | 7 |

Q.no.	Module 6	Marks
6a	Describe Yule Walker method for AR model parameters	5

Answer b or c

- | | | |
|----------|--|----------|
| b | Explain Burg method for estimating AR model parameters | 7 |
| c | Write a note on ARMA model in detail. | 7 |