Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **18EC3001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED DIGITAL SIGNAL PROCESSING** | **Max. marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Design a digital Chebyshev IIR low pass filter with the following specification  ,  , with T=1 sec. Apply bilinear transformation. | CO1 | 8 |
| b. | In an LTI system the input x(n) = {1,2, 3} and the impulse response h(n) ={-1,-1}. Determine the response of LTI system by radix-2 DIF method. | CO6 | 8 |
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| 2. | a. | The transfer function of an FIR filter is given as H (z) = . Perform polyphase decomposition of H (z) to decompose in to 2 sections, 3 sections and 4 sections. | CO2 | 10 |
| b. | Illustrate the effect on power spectrum due to up sampling and down sampling with relevant diagrams. | CO2 | 6 |
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| 3. | a. | Explain all pole modeling using auto correlation and covariance method. | CO3 | 8 |
| b. | Derive the Yule-Walker equations to obtain the relationship between the model parameters and the Autocorrelation | CO3 | 8 |
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| 4. |  | Derive the weight vector update equation for the LMS algorithm. Discuss in detail the convergence issues of the LMS algorithm. | CO4 | 16 |
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| 5. | a. | Explain in detail about the Autoregressive Spectrum Estimation with relevant diagrams. | CO5 | 10 |
| b. | Briefly Compare the performance measures for the Nonparametric methods of Spectrum Estimation. | CO5 | 6 |
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| 6. |  | Derive Wiener Hopf equations and the minimum mean square error for the FIR wiener filter. | CO4 | 16 |
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| 7. | a. | Explain the need for multistage implementation of sampling rate conversion. Describe the implementation for a factor of I/D. | CO2 | 10 |
| b. | What is discrete wavelet transform? List the applications of wavelet transform. | CO6 | 6 |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | Explain the application of adaptive filters in image processing applications. | CO6 | 10 |
| b. | Explain in details with diagrams about the DSP concepts applied to RADAR applications. | CO6 | 10 |