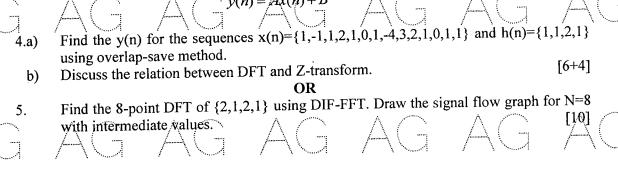
## **R16** Code No: 136BE JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B. Tech III Year II Semester Examinations, May - 2019 DIGITAL SIGNAL PROCESSING (Common to ECE, EIE) Max. Marks: 75 Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions. (25 Marks) What is the necessary and sufficient condition on the impulse response for stability.[2] 1.a) Find the z-transform of the sequence $x(n) = (\frac{1}{2})^{n-1}u(n-1)$ . [3] b) Write the differences between DFT and FFT. What is the speed improvement factor in calculating 64-point DFT of a sequence using d) [3] direct computation and FFT algorithms? [2] Compare analog and digital filters. e) What the properties of properties of the bilinear transformation? [3] f) [2] Describe the various characteristic features of windows. g) [3] Distinguish between FIR and IIR filters. What is mean by limit cycle oscillations? i) What is significance of decimator and interpolator in multirate DSP PART - B (50 Marks) Obtain the direct form-II realization for the given system. 2.a) y(n) = -0.1y(n-1) + 0.72y(n-2) + 0.7x(n) + 0.252x(n-2)Determine the transfer function H (Z) of the system given by y(n-1)+5y(n) = 4x(n)+5x(n-1)+6x(n-2)Find the impulse response of the system described by difference equation 3.a) y(n)-3y(n-1)-4y(n-2) = x(n)+2x(n-1) using z transform. [5+5] Test if the following system is linear time invariant or not. b) y(n) = Ax(n) + B



## Determine the order and poles of type-I chebyshev low pass filter for the given 6. specifications $\alpha_p = 1dB$ , $\alpha_s = 40dB$ , $\Omega_p = 1000\pi \, rad/\sec$ , $\Omega_s = 2000\pi \, rad/\sec$ $\frac{1-z^{-1}}{1+z^{-1}}$ in the designing of IIR filter using bilinear transformation 7.a) Discuss impulse invariance method. What are its disadvantages? [6+4]b) Compare Hamming window and Rectangular window in terms of characteristics. 8.a) Prove that for a linear phase FIR filter the impulse response is symmetric. Design an ideal low pass filter with frequency response 9. $H_d(e^{j\omega}) = 1$ for $-\frac{\pi}{2} \le \omega \le \frac{\pi}{2}$ Find the values of h(n) using hamming window for N=11. Find the H(z) Discuss the finite word length effects in FIR filters. 10.a) What is Round-off Noise in IIR Digital Filters? Discuss its effects in IIR filters. OR Describe the interpolation process with factor D and obtain the necessary expressions. 11. ---ooOoo---