00635

B.TECH. - VIEP - ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination, 2019

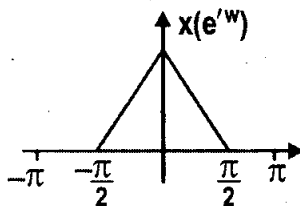### BIELE-014 : MULTIRATE SYSTEMS

Time : 3 Hours]   [Maximum Marks : 70

Note : Answer **any five** questions. **All** questions carry **equal marks**. Missing data if any may be suitably assumed. Use of Scientific Ccalculator is permitted.

1. (a)   If $x(n) = (1, -1, 2, 4, 0, 3, 2, 1, 5, ...)$,   [2×7=14] then find $y(n) = x(nm)$ for $M = 2$

    (b)   The frequency response of an input sequence $x(n)$ is $x(e^{'w})$. If the input signal is passed through a down sampler (m=2), Find the frequency response of the output. Give your comment on aliasing :

2. (a) The magnitude response of x(n) shown in figure (a) is applied to a multirate system shown in figure (b). Sketch $x_1(e^{jw})$ and $x_2(e^{jw})$. [7]
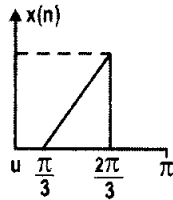

Figure (a)

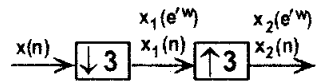Figure (b)

(b) Discuss the multirate signal processing with proper examples. [7]

3. (a) Explain the poly phase structure of Interpolator.[7]

(b) Describe the polyphase Delimation using the z-transform. [7]

4. (a) What is the need for anti-imaging filter after up sampling a signal ? [7]

(b) Describe the various method for the cancellation of aliasing error in the Quadrature Mirror Filter (QMF) banks. [7]

5. (a) Discuss the sub band coding filter bank and synthesis filter bank. [7]

(b)   Explain alias free filter bank. Why is it used ? [7]

6.   (a)   What are the necessary conditions required for linear phase property ?   [7]

(b)   Explain the FIR-PR System with suitable examples.   [7]

7.   (a)   Discuss the lattice structures for LPPR with suitable examples.   [7]

(b)   Discuss quantization effects in filter banks. How can quantization error be minimised using filter bank ?   [7]

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