

- Q.4** Compare direct form I with form II of IIR filter structures. (10)
Determine direct form I and II realization for following LTI system.
 $y(n) = x(n) - x(n-1) + 2x(n-2) - 3x(n-4)$

OR

Draw signal flow graph for implementing direct form II of causal LTI system (10)
with

$$H(Z) = \frac{1 + \frac{1}{5}Z^{-1}}{\left(1 - \frac{1}{2}Z^{-1} + \frac{1}{3}Z^{-2}\right)\left(1 + \frac{1}{4}Z^{-1}\right)}$$

- Q.5** Explain the design steps for IIR filter design using Bilinear Transformation method. What is Frequency warping problem and how it can be compensated? (10)

OR

Compare Impulse Invariance method with Bilinear Transformation method. (10)
Explain Butterworth filter Approximation.

- Q.6** Describe Speech Recognition, Speech Synthesis and Echo cancellation with neat diagrams. (10)

OR

Draw and explain architecture of DSP processor TMS320C 64X. (10)

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