DIGITAL SIGNAL ANALYSIS

[30 M]

END EXAM
FEB/MAR - 2025

2 hrs

ANSWER ALL QUESTIONS

1. Calculate Inverse Z-transform for [4M]

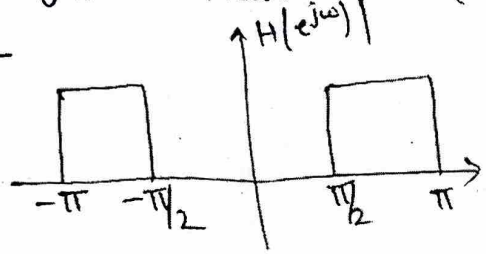
$$X(z) = \frac{z^3 + z^2}{(z-1)(z-3)} \quad \text{ROC } |z| > 3$$

2. Find the IDFT of the sequence [6M]

$X(k) = \{4, 1-j2.414, 0, 1-j0.414, 0, 1+j0.414, 0, 1+j2.414\}$ using DIT algorithm.

3. Design FIR filter without window (for N=9) — [7M]

for



4. Draw direct form-II realization of [3 M]

$$H(z) = \frac{1 - 0.5z^{-1}}{1 - 0.7z^{-1} + 0.3z^{-2}}$$

5. Explain LTI model of Speech production and obtain vocal track system function. [4M]

6. Find the impulse response of discrete system [4M]

$$y(n) - y(n-1) + \frac{3}{16}y(n-2) = x(n) - \frac{1}{2}x(n-1)$$

7. Give the example for [2M]
   (i) unstable system function
   (ii) power signal.

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