M.Tech (ECE) 1st Semester Examination
Advanced Digital Signal Processing
Subject Code: ECL-503

Time Allowed: 03 hours. Maximum Marks: 100

Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Attempt any five questions and all questions carry equal marks.

Section – A

1(a) Differentiate between FIR and IIR digital filters.

(b) Obtain the direct form I and II for given transfer function

\[ H(Z) = \frac{0.28 z^2 + 0.319z + 0.04}{0.5z^3 + 0.3z^2 + 0.17z - 0.2} \]

2(a) Why do we require multirate DSP. Write three applications of M DSP.

(b) Transfer function \( H(S) \) of an analog filter is given at \( T=2 \) seconds:

\[ H(S) = \frac{s + 0.1}{9 + (s + 0.1)^2} \]

Convert it into digital filter using bilinear transformation method.

3(a) Discuss the forward and backward linear prediction.

(b) What is AR, MA and ARMA lattice? Explain any one.

Section – B

4(a) Define FFT. Calculate 8 point DFT using FFT.

(b) Describe chirp-z transform algorithm. What is its importance?

5(a) What do you understand by FIR hardware? Explain its different form.

(b) Justify the need of multipliers and dividers in signal processing hardware.

6(a) Discuss the model of Speech production.

(b) Describe the linear prediction of speech.