

Exam. Code: 0925

Sub. Code: 6863

1128

B. Engg. (Information Technology)

7th Semester

ITE-741: Digital Signal Processing

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt **five** questions in all, including Q. No. 1 (Unit-I) which is compulsory and selecting atleast two questions each from Unit II-III.

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UNIT-I

- I. (a) What are the various advantages and disadvantages of DSP?
(b) Write down conversion formula from H(s) to H(z) for Impulse invariant IIR filter.
(c) Write down hamming window function.
(d) What is time shifting property of Z transform?
(e) What is the difference between DTFT and DFT? (5×2)

UNIT-II

- II. (a) Perform the Z transform of the signal using various properties, $x(n) = (2)^n u(n-3)$ Also find ROC for x(n)
(b) Find inverse Z-transform of the signal $X(z) = \frac{1}{(1-z^{-1})(1+z^{-1})^2}$ (5+5)
- III. Find 4 point DFT of the signal. Signal is $x(n) = \left\{ \cos \frac{n\pi}{4} \right\}$ (10)
- IV. Perform IFFT for $X(K) = \{36, (-4 + j9.656), (-4 + j4), (-4 + j1.656), -4, (-4 - j1.656), (-4 - j4), (-4 - j9.656)\}$ (10)

UNIT-III

- V. (a) Perform Direct form and cascade realization of the following structure $H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}$

Contd.....P/2

(2)

- (b) Realize structure using minimum number of multipliers

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

- VI. (a) Determine
- $H(z)$
- for the following transfer function

$$H(s) = \frac{36}{(s+0.1)^2 + 36}$$

- (b) A low pass filter is to be designed with the following desired frequency response. Determine filter coefficients for rectangular window for
- $M=7$
- .

$$H_d(e^{j\omega}) = \begin{cases} e^{-2j\omega}, & -\frac{\pi}{4} \leq \omega \leq \frac{\pi}{4} \\ 0, & \text{for } \frac{\pi}{4} \leq \omega \leq \pi \end{cases} \quad (5+5)$$

- VII. Write note on the DSP chip ADSP21XX. (10)

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