http://www.sgbauonline.com

4. a) If $x(n)=\{\underset{\uparrow}{1}, 2, -1\}$, $h(n)=x(n)$ then find convolution sum. 7

b) Sketch and determine convolution sum of given signals: 6
$x(n)=\{1, \underset{\uparrow}{2}, 3, 1\}$ & $h(n)=\{\underset{\uparrow}{1}, 2, 1, -1\}$.

5. a) What are the advantages of z-transform? Classify Z-transform. 8

b) What do you understand by region of convergence? Explain the significance of ROC. 6

OR

6. a) It is given that $x_1(n)=\{\underset{\uparrow}{1}, 2, 3, 4, 0, 1\}$ using time shifting property, find Z.T. of $x_2(n)$ where $x_2(n)=\{1, 2, \underset{\uparrow}{3}, 4, 0, 1\}$. 8

b) Determine Z.T. including ROC of the following signal as $x(n)=\left(\frac{1}{2}\right)^n \{u(n)-u(n-10)\}$. 6

7. a) Compute DFT of sequence given as - 7
$x(n)=(-1)^n$ for (i) $N=3$ & (ii) $N=4$.

b) Explain DIFFT algorithm in detail with neat flow diagram for N=8. 6

OR

8. a) The first five point of 8-point DFT of a real valued sequence are- 6
$\{0.25, 0.125-j0.3018, 0, 0.125-j0.0518, 0\}$
Determine remaining 3-points.

b) Using graphical method obtain a 5 - point circular convolution of two DT signals defined as- 7
$x(n)=(1.5)^n \quad 0 \le n \le 2$
$y(n)=2n-3 \quad 0 \le n \le 3$
Does the circular convolution obtained is same to that of linear convolution?

9. a) Explain how an analog filter is converted into equivalent digital filter using Bilinear Transformation. 7

b) Design an ideal low pass filter with frequency response. 6
$H_d(\omega)=1 \quad -\pi/2 \le \omega \le \pi/2$
$=0 \quad \pi/2 \le |\omega| \le \pi$
For N = 11 by (i) Rectangular (ii) Triangular

OR

10. a) Explain the frequency sampling method of designing the FIR filter. 7

http://www.sgbauonline.com

http://www.sgbauonline.com

http://www.sgbauonline.com

http://www.sgbauonline.com

B.E. Eighth Semester (Computer Engineering) (CGS)

10293 : Digital Signal Processing : 8 KE 01

P. Pages : 3 | **AU - 3019**

Time : Three Hours | Max. Marks : 80

Notes :
1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Illustrate your answer necessary with the help of neat sketches.
4. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Draw and explain the block diagram of digital signal processing system. State the advantages of DSP over ASP. **7**

b) Explain the various operations that can be performed on discrete time signals. Why folding shifting is not equal to shifting folding? **6**

OR

2. a) Solve for periodic or aperiodic: **6**

i) $x(n)=e^{j6\pi n}$

ii) $x(n)=\cos\left(\frac{2\pi}{3}\right)n$.

iii) $x(t)=\cos^2(2\pi t)$.

b) Sketch the signal x (n) and find out the response of following signal as- **7**

$x(n)= |n| \quad -3 \le n \le 3$

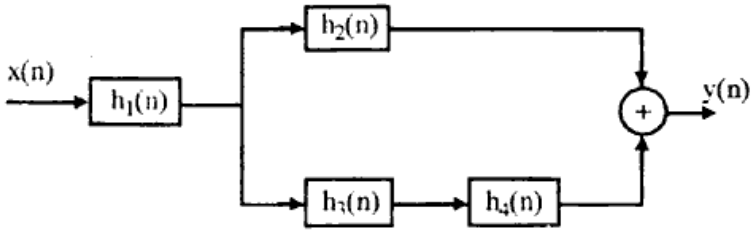
$= 0 \quad$ otherwise

Find out -

i) y (n) = x (n) ii) y (n) = x (n–1)

iii) y (n) = x (2-n)

3. a) Consider the interconnection of LTI system as shown below: **7**



Determine h (n) when:

$h_1(n)=\left\{\frac{1}{2},\frac{1}{4},\frac{1}{2}\right\}$

$h_2(n)=h_3(n)=(n+1)u(n)$.

b) State and prove the necessary and sufficient condition for LTI system to be stable. **6**

OR

http://www.sgbauonline.com

http://www.sgbauonline.com

http://www.sgbauonline.com

http://www.sgbauonline.com

b) Determine impulse response h (n) of a filter having desired frequency response. **6**

$$H_d\left(e^{j\omega}\right) = e^{-j(m-1)\omega/2} \quad \ldots\ldots \quad 0 \le \omega \le \pi/2$$

$$= 0 \quad \ldots\ldots \quad \pi/2 \le \omega \le \pi$$

11. a) Obtain the cascade and parallel realization of **7**

$$H(z) = \frac{2\left(1-z^{-1}\right)\left(1+\sqrt{2}\,z^{-1}+z^{-2}\right)}{\left(1+0.5z^{-1}\right)\left(1-0.9z^{-1}+0.81z^{-2}\right)}$$

b) Determine the lattice-ladder realization for- **7**

$$H(z) = \frac{1-z^{-1}}{1-(2r\cos w_0)z^{-1}+r2z^{-2}}$$

What happens if r = 1?

OR

12. a) Consider the Pole-zero system with system function: **7**

$$H(z) = \frac{\left(1-0.5\,e^{j\pi/4}\cdot z^{-1}\right)\left(1-0.5e^{-j\pi/4}\cdot z^{-1}\right)}{\left(1-0.8e^{j\pi/3}\cdot z^{-1}\right)\left(1-0.8\,e^{-j\pi/3}\cdot z^{-1}\right)}$$

Sketch the regular and transpose direct form-II realization of the system.

b) Draw the direct form - I and parallel realization of- **7**

$$y(n) = y(n-1) - \frac{1}{2}\,y(n-2) + x(n) - x(n-1) + x(n+2).$$

****

http://www.sgbauonline.com

Whatsapp @ 9300930012
Your old paper & get 10/-
पुराने पेपर्स भेजे और 10 रुपये पायें,
Paytm or Google Pay से

http://www.sgbauonline.com