

PART-B

(Answer one full question from each module .Each question carries 20 marks)

Module 1

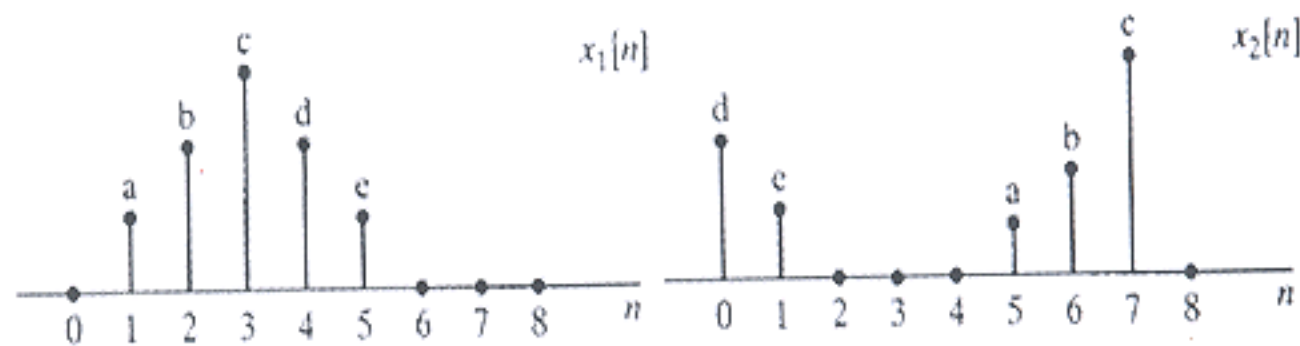
11. a) Consider the complex sequence

$$x[n] = e^{j\omega_0 n} \quad 0 \leq n \leq N-1$$

$$= \text{otherwise}$$

Find the N point DFT of $X(k)$ of finite length sequence $x[n]$.

b) The two eight point sequences $x_1[n]$ and $x_2[n]$ shown in figure have DFTs $X_1(k)$ and $X_2[k]$. Determine the relationship between $X_1(k)$ and $X_2[k]$



c) Suppose we have two four point sequences $x[n]$ and $h[n]$ as follows

$$x[n] = \cos\left(\frac{\pi n}{2}\right), \quad n=0,1,2,3$$

$$h[n] = 2^n, \quad n=0,1,2,3$$

- Calculate the four point DFT $X[k]$
- Calculate the four point DFT $H[k]$
- Calculate $y[n] = x[n] \circledast_4 h[n]$ without doing the circular convolution.

[6+4+10=20 marks]

12. a) Draw the signal flow diagram of an 8 point DIT-FFT algorithm.

b) Find the DFT of the given sequence $x[n]$ using FFT algorithm.

$$x[n] = [1 \ 1 \ 0 \ 0 \ -1 \ -1]$$

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