

UNIT II**PART A 2marks**

1. How many multiplication and additions are required to compute N point DFT using radix 2 FFT? (2)
2. Define DTFT pair. (2)
3. What are Twiddle factors of the DFT? (2)
4. State Periodicity Property of DFT. (2)
5. What is the difference between DFT and DTFT? (2)
6. Why need of FFT? (2)
7. Find the IDFT of $Y(k) = (1, 0, 1, 0)$ (2)
8. Compute the Fourier transform of the signal $x(n) = u(n) - u(n-1)$. (2)
9. Compare DIT and DIF? (2)
10. What is meant by in place in DIT and DIF algorithm? (2)
11. Is the DFT of a finite length sequence is periodic? If so, state the reason. (2)
12. Draw the butterfly operation in DIT and DIF algorithm? (2)
13. What is meant by radix 2 FFT? (2)
14. State the properties of W_N^k (2)
15. What is bit reversal in FFT? (2)
16. Determine the no of bits required in computing the DFT of a 1024 point sequence with SNR of 30dB. (2)
17. What is the use of Fourier transform? (2)
18. What are the advantages FFT over DFT?

PART B 16marks**FOURIER TRANSFORM:**

1. a) Determine the Fourier transform of $x(n) = a^{|n|}$; $-1 < a < 1$
(8)
- b) Determine the Inverse Fourier transform $H(\omega) = (1 - ae^{-j\omega})^{-1}$ (8)
2. State and prove the properties of Fourier transform (16)

FFT:

3. Determine the Discrete Fourier transform $x(n) = (1, 1, 1, 1)$ and
Proof $x(n) * h(n) = X(z) H(z)$ (16)
4. Derive and draw the 8 point FFT-DIT butterfly structure. (16)
5. Derive and draw the 8 point FFT-DIF butterfly structure. (16)
6. Compute the DFT for the sequence $(0.5, 0.5, 0.5, 0.5, 0, 0, 0, 0)$ (16)
7. Compute the DFT for the sequence $(1, 1, 1, 1, 1, 0, 0)$ (16)
8. Find the DFT of a sequence $x(n) = (1, 1, 0, 0)$ and find IDFT of $Y(k) = (1, 0, 1, 0)$ (16)
9. If $x(n) = \sin(n\pi/2)$, $n=0, 1, 2, 3$ (16)
10. $h(n) = 2^n$, $n=0, 1, 2, 3$. Find IDFT and sketch it. (16)
11. Find 4 point DFT using DIF of $x(n) = (0, 1, 2, 3)$ (16)
12. a) Discuss the properties of DFT. (10)
b) Discuss the use of FFT algorithm in linear filtering. (6)