V_ Exte_ CB 27.05.2019

Paper / Subject Code: 32204 / Discrete Time Signal Processing

(3 Hours) **[Total Marks: 80**

N.B.: (1) **Questions No.1** is **compulsory**.
(2) Attempt **any three** questions out of remaining **five** questions.
(3) Assume suitable **data** if **required**.
(4) **Figures** to the **right** indicate **full marks**.

Q 1.Solve **any four** **20**

a) Compare Impulse invariant method and BLT method.
b) If x[n]={1,2,1,2} , determine X[K] using DIF FFT.
c) State and prove frequency shifting property of DFT.
d) Write a short note on replication.
e) State advantages of digital filters.

Q 2 a) Develop composite radix DITFFT flow graph for N=6=2*3. **10**

b) Design a digital Butterworth filter that satisfies following constraints using bilinear transformation method. Assume Ts=0.1s. **10**

$0.8 \le |H(e^{jw})| \le 1 \qquad 0 \le w \le 0.2\pi$

$|H(e^{jw})| \le 0.2 \qquad 0.6\pi \le w \le \pi$

Q 3 a) Explain Dual Tone Multifrequency Detection using Goertzel's algorithm. **10**

b) Design a linear phase FIR low Pass filter of length 7 and cut off frequency 1 rad/sec using Hamming window. **10**

Q 4 a) Compute DFT of x[n]={1,2,3,4,5,6,7,8} using DITFFT algorithm. **10**

b) Explain Finite word length effects in digital filters. **10**

Q.5 a) Explain Architecture of TMS320C67XX DSP processor with the help of neat block Diagram **10**

b) Find DFT of x(n)={1,2,3,4}. Using these results and not otherwise find DFT **10**

i) $x_1(n)$={4,1,2,3}
ii) $x_2(n)$={2,3,4,1}
iii) $x_3(n)$={6,4,6,4}

Q 6. Solve following

a) Obtain digital filter transfer function by applying impulse invariance transfer function. **08**

$H(s)=\frac{s}{(s+5)(s+2)}$ if Ts=0.1s.

b) Explain application of DSP processor to radar signal processing. **06**

c) Write short note on limit cycle oscillations **06**

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