T.E/Sem V/ DTSP/CBCS/EXTC

27 May 2019

(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

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

$|H(e^{jw})| \leq 0.2 \quad 0.6\pi \leq w \leq \pi$

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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