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JAYPEE UNIVERSITY OF INFORMATRION TECHNOLOGY, WAKNAGHAT

T-2, Examination, October, 2017

B.Tech, V Semester

COURSE CODE: 10B11EC512 **MAX. MARKS: 25**

COURSE NAME: Digital Signal Processing

COURSE CREDITS: 04 **MAX. TIME: 1.5 HRs**

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q.1	Prove that the DTFT of $x(n) = \begin{cases} 1, & 0 \le n \le M \\ 0 & \end{cases}$ is $x(w) = e^{\frac{jMw}{2}} \frac{\sin\left(\frac{M+1}{2}\right)w}{\sin(w/2)}$.	02
Q.2	Prove the circular time shift property of DFT.	03
Q.3	Prove the symmetry and periodicity property of twiddle factor.	02
Q.4	Compute the 4-point DFT of a sequence $x(n) = \left\{\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}, 0, 0, 0, 0\right\}$ using radix-2 DIT FFT algorithm.	06
Q.5	Compute the 8-point IDFT of a sequence $x(n) = \{2,0,2,0\}$ using radix-2 DIT FFT algorithm.	04
Q.6	Write the relation between DTFT, DFT, Z-transform, and DFS.	02
Q.7	Define the following: (a) Convolution (b) Correlation (c) Impulse response (d) Convolution property of Z-transform	04
Q.8	Compute the linear convolution using periodic convolution of sequences $x(n) = \{1\ 2\ \ 1\ 1\}$ and $y(n) = \{1\ 2\ \ 3\}$	02