

VI- SEM ETC & TELECOM./ELECT&ETC/AE&I/2019(W)/ (New)

ETT-603-DIGITAL SIGNAL PROCESSING

Full Marks: 80

Time: 3 Hours

Answer any FIVE Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

1.	Answer ALL the following: (a) Define sampling Theorem. (b) Differentiate between discrete signal and digital signal. (c) What is an LTI system? (d) Define ROC. (e) Write down any two properties of Z- transform. (f) What is the condition for system stability? (g) What is Zero padding? (h) Distinguish between DFT& DTFT. (i) Define Twiddle factor. (j) Define causal & non causal system.	2 x 10
2.	Answer any SIX questions: (a) Determine the system described by $y(n) = [x(n) + \frac{1}{x(n)}]$ is linear or non linear, where $x(n)$ & $y(n)$ are input and output respectively. http://www.sctevtonline.com (b) Write down the properties of Z-transform. (c) Find the 4-point DFT of the sequence $x(n) = \{1, 2, 1, 1\}$ (d) Sketch the block diagram representation of discrete time system described by the input, output relation $y(n) = 2y(n-1) + 3y(n+1) + x(n) + \frac{1}{2x(n+1)} + \frac{1}{4x(n-2)}$, where $x(n)$ is the input & $y(n)$ is the output sequence. (e) Determine the Power and Energy of Unit step signal. (f) Compare the advantage of digital signal processing over analog signal processing. (g) Explain the properties of recursive and non recursive discrete time system.	5x6
3.	Define the term signal and signal processing, Explain the digital signal processing system with neat block diagram	2+8
4.	Determine the Z-transform and ROC of the signal: $x(n) = a^n u(n) + b^n u(-n-1)$	10
5.	Determine the circular convolution of the sequences $x_1(n) = \{2, 1, 2, 1\}$ and $x_2(n) = \{1, 2, 3, 4\}$	10
6.	Find the 8-point DFT of the sequence is given by $x(n) = \{2, 1, 2, 1, 1, 2, 1, 2\}$ by radix-2 DIT-FFT.	10
7.	Write down the properties of DFT.	10