Hall Ticket Number :										

R-11 / R-13

Code: 1G372

IV B.Tech. I Semester Supplementary Examinations October 2020

Digital Signal Processing

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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1. Find the natural response and zero state response of the system described by the difference equation
   $y(n)+2y(n-1)+y(n-2)=x(n)+x(n-1)$ with initial condition $y(-1)=y(-2)=1$ and input $x(n)=(1/2)^n u(n)$

2. State and prove the following properties of discrete Fourier series
   i) Linearity ii) Time reversal

3. What is the need of FFT? Explain 16-point radix-2 DIT-FFT algorithm with the help of flow-graph and necessary steps

4. a) Find the z-transform and ROC of the following signals
   (i) $x(n)=a^n u(n)$ **(ii)** $x(n)=(1/2)\delta(n) + \delta(n-1) + (1/2)\,\delta(n-2)$
   b) State and prove the following properties of z-transform
   (i) Multiplication by an exponential sequence
   (ii) differentiation in z-domain

5. Design a Chebyshev filter with a maximum passband attenuation of 2.5dB at $\Omega p=20$ rad/sec and the stop band attenuation of 30dB at $\Omega s=50$ rad/sec

6. a) Distinguish between the IIR and FIR filters
   b) Determine the magnitude and phase responses of linear phase FIR filter for N is odd

7. a) List out the applications of multirate signal processing
   b) Consider a signal $x(n) = u(n)$
   (i) Determine and sketch a signal with a decimation factor '3'
   (ii) Determine and sketch a signal with a interpolation factor '3'

8. Write short notes on
   (i) Echo filter
   (ii) Reverberation
   (iii) Chorus generator

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