GOVERNMENT WOMEN ENGINEERING COLLEGE AJMER

B.TECH VII SEM

I MID TERM EXAMINATION 2017-ECE-A

TIME: 60 MIN. MAX. MARKS: 20

DIGITAL SIGNAL PROCESSING

1. Determine the response of LTI system with impulse response $h(n)=(1/2)^{n}u(n)$ to the input signal $x(n)= 10-5 \sin(\pi/2)n+ 20 \cos(\pi) n$ (5)
2. Determine the system function, Frequency response and impulse response of a system described by the second order difference equation
   $y(n)-y(n-1)+3/16\, y(n-2)= x(n)-1/2\, x(n-1)$
   (5)
3. The frequency response of a system is given as
   H (w) = (5)

   Where a and b are real and $a \neq b$.Show that $|H(w)|^2$ is a constant if ab=1 and determine its value.

OR

4. Decompose the given system function H(z) into a product of Minimum Phase system and All Pass system.
   $H(z)= \dfrac{1+3z^{-1}}{1+1/2z^{-1}}$ (5)
5. Write Short note on(any two)
   (a) All Pass systems
   (b) Minimum Phase systems
   (c) Linear Phase systems (5)

OR

6. Consider an LTI system with system function
   $H(z)= \dfrac{1+2z^{-1}}{1-1.5\, z^{-1} +0.9\, z^{-1}}$ (5)
   Draw the D-I & D-II SFG and Transposed D-II for the system.

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1. Convert the following analog filter into a digital filter using impulse invariance method.

OR

2. Design an analog Butterworth filter that has a cut off frequency of 20 rad/sec and 20dB attenuation at 40 rad/sec.
3. Convert the analog filter with transfer function

   into a

   digital filter using Bilinear Transformation method. The digital filter is required to have a resonant frequency of $\omega_r = \pi/2$

OR

4. Design a single pole digital Low pass filter with a 3dB Bandwidth of 0.2π using Bilinear Transformation method on the analog filter with system function H(s)=
5. Determine the order of a Butterworth filter that satisfy the following constraints:

   With T=01 sec.Apply impulse invariance method.

OR

6. Draw the cascade and parallel form network structure for the system
   Y(n)=3/4 y(n-1)- 1/8 y(n-2) + x(n) +1/3 x(n-1)