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I am really sorry about what happened.
You have near perfect score for the third question.
Don't lose courage
Make up with the next exam.

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3a.) $\frac{Y(z)}{X(z)} = H(z) = \frac{1+z^{-1}}{1-\frac{3}{5}z^{-1}+\frac{2}{25}z^{-2}}$

$Y(z) = \frac{3}{5}Y(z)z^{-1} + \frac{2}{25}z^{-2}Y(z) = X(z) + X(z)z^{-1}$

inverse transform

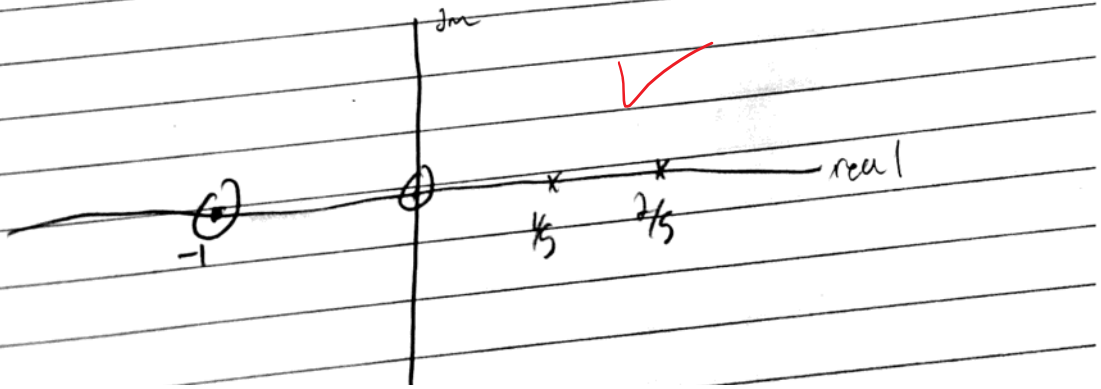
$y(n) = \frac{3}{5}y(n-1) + \frac{2}{25}y(n-2) = x(n) + x(n-1)$ ✓

b.) gain $= \frac{2\times1}{4\times3} = \frac{1}{6}$ 1 −1

c.) re write

$H(z) = \frac{(z+1)z}{(25z^2-15z+2)} = \frac{(z+1)z}{(5z-1)(5z-2)}$ ✓

zeros at $-1, 0$
poles at $\frac{1}{5}, \frac{2}{5}$



3d.) $H(z) = \frac{1+z^{-1}}{1-\frac{3}{5}z^{-1}+\frac{2}{25}z^{-2}}$

$H(z) = \frac{z^{-1}(z+1)}{z^{-2}\left[z^2-\frac{3}{5}z+\frac{2}{25}\right]}$

$H(z) = \frac{z^2+z}{z^2-\frac{3}{5}z+.08} = \frac{z^2+z}{z^2-.6z+.08}$

$H(z) = \frac{(z^2-.6z+.08)1 + 3(z^2-.6z+.08)}{1.6z-.08}$

$H(z) = \frac{1+1.6z-.8}{z^2-.6z+.08}$

$H(z) = \frac{1+\frac{1.6z-.8}{(z^2-.4(z-.2)}}{} \rightarrow \frac{1.6z-.8}{(z-.4)(z-.2)} \rightarrow$

Roc is $|z| > .2$

.4 -1

e) $H(z) = \frac{1}{z-.4} - \frac{.5}{z-.2}$ inverse z transform

$h(n) = \delta(n) - .8(0.4)^{n-1}u(n-1) + 2.4(.2)^n u(n-1)$

$h(n) = 1 + 0.8\left[\frac{1}{(1-.4)}\right] + 2.4\left[\frac{1}{1-.2}\right] + .32 - .48$

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$= 1 - \frac{.8}{.16} + \frac{2.4}{.8} + .32 - .44$

$\Rightarrow \frac{96}{25} - \frac{4}{5}$

$h(n) = 2.56 < \infty$ ∴ stable ✓

3f.) $y(n) = 2\left(\frac{2}{5}\right)^n u(n) - \left(\frac{1}{5}\right)^n u(n)$

$y(z) = \frac{2z}{z-.4} - \frac{z}{z-.2}$

$= z\left[\frac{2}{z-.04} - \frac{1}{z-.2}\right]$

$= z\left\{\frac{2z-.4-z+.4}{(z-.4)(z-.2)}\right\}$

$y(z) = \frac{z(z)}{(z-.4)(z-.2)} \Rightarrow y(z) = H(z) \times X(z)$

$\frac{z^2}{(z-.4)(z-.2)} = \frac{z^2+z}{(z-.4)(z-.05)} \times (z)$ ✓

$x(z) = \frac{z^2}{z^2+z}$

$x(zz) = \frac{z}{z+1}$ ✓ Z-transform

$x(n) \cdot (-1)^n u(n)$ ✓ Great job.

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