1. **B.** $f = \frac{0.56\pi}{2\pi} = 0.28 = \frac{7}{25} \rightarrow$ period=25. **NOTE: Discrete time!**

2. **B.** $\sin(40\pi\frac{n}{100}) + 2\sin(160\pi\frac{n}{100}) = \sin(0.4\pi n) + 2\sin(1.6\pi n) = -\sin(0.4\pi n)$. **Miss "2"?**

3. **B.** $\{1,2\} * \{3,4,5\} = \{1\cdot 3, 2\cdot 3 + 1\cdot 4, 2\cdot 4 + 1\cdot 5, 2\cdot 5\} = \{3, 10, 13, 10\}$.

4. **C.** $H(z) = \mathcal{Z}\{y[n]\}/\mathcal{Z}\{x[n]\} = [\frac{2z^2 - 3z}{z^2 - 3z + 2}]/[\frac{z}{z-2}] = \frac{2z-3}{z-1}$.

5. **D.** $H(z) = \mathcal{Z}\{y[n]\}/\mathcal{Z}\{x[n]\} = \frac{4 + 5z^{-1} + 6z^{-2}}{1 + 2z^{-1} + 3z^{-2}} = \frac{4z^2 + 5z + 6}{z^2 + 2z + 3}$.

6. **C.** $\frac{z}{z-2}\frac{z+4}{z+4} + \frac{z}{z+4}\frac{z-2}{z-2} = \frac{2z^2 + 2z}{z^2 + 2z - 8}$. **For #7: Use initial value theorem to check.**

7. **E.** $\frac{H(z)}{z} = \frac{2}{z^2 + 1} = \frac{j}{z+j} - \frac{j}{z-j} \rightarrow h[n] = j(-j)^n u[n] - j(j)^n u[n] = 2\sin(\frac{\pi}{2}n)u[n]$.

8. **C.** $H(z) = \frac{z^2 - 5z + 6}{z^2(z-1)} = (1 - 5z^{-1} + 6z^{-2})\frac{z}{z-1}z^{-1} \rightarrow h[n] = \{\underline{1}, -5, 6\} * u[n-1]$.

9. **D.** $H(z) = 1/[\frac{z}{z-2}\frac{z-4}{z-4} + \frac{z}{z-4}\frac{z-2}{z-2}] = \frac{z^2 - 6z + 8}{2z(z-3)}$. $h[n] = \frac{1}{2}\{1, -6, 8\}(3)^n u[n] = C(3)^n$ for $n > 3$.

10. **A. 1-sided:** $Y^+(z) - 2z^{-1}Y^+(z) - 2y(-1) = 0 \rightarrow Y^+(z) = \frac{2z}{z-2} \rightarrow y[n] = 2(2)^n u(n)$.

11. **C.** Poles are **denominator**=0 roots; zeros are **numerator**=0 roots.

12. **B.** $\frac{Y(z)}{X(z)} = \frac{z}{z^2 - 3z + 2}\frac{z^{-2}}{z^{-2}} = \frac{z^{-1}}{1 - 3z^{-1} + 2z^{-2}}$. Cross-multiply and take inverse z-transform.

13. **C.** $\frac{H(z)}{z} = \frac{1}{(z-1)(z-2)} = \frac{1}{z-2} - \frac{1}{z-1} \rightarrow H(z) = \frac{z}{z-2} - \frac{z}{z-1} \rightarrow h[n] = 2^n u[n] - u[n]$.

14. **E.** $Y(z) = H(z)X(z) = \frac{z}{z^2 - 3z + 2}\frac{2z^2 - 6z + 4}{z^2} = \frac{2}{z} \rightarrow y[n] = 2\delta[n-1]$. **Watch z power!**

15. **C.** $Y(z) = H(z)X(z) = \frac{z}{(z-1)(z-2)}\frac{z-1}{z} = \frac{1}{z-2} \rightarrow y[n] = 2^{n-1}u[n-1]$.

16.

(i)	$(0.2)^n u[n] + 2^n u[n]$	$\{z : |z| > 2\}$	causal	unstable
(ii)	$(0.2)^n u[n] - 2^n u[-n-1]$	$\{z : 0.2 < |z| < 2\}$	noncausal	stable
(iii)	$-(0.2)^n u[-n-1] - 2^n u[-n-1]$	$\{z : |z| < 0.2\}$	anticausal	unstable

SCORE	Mean	100	95	90	85	80	75	70
NUMBER	89.4	15	09	12	03	05	02	06

A few scores between these ranges were rounded up or down.
Undergraduates and graduates (only 5) are lumped together.
Two taking the exam late are not listed above.
OK, it was too easy. Exam #2 will be harder!