Quiz 1

① $\left(e^{j(-9\pi/2)} + e^{j\pi} + e^{j(-3\pi/2)}\right)^* = \left(e^{j(-5\pi)}\right)^* = e^{j5\pi}$

in $a+bj$ form $\Rightarrow \cos(5\pi) + \underbrace{j\sin(5\pi)}_{0} = \cos(\pi) = \boxed{-1 + j0}$

② $y_{cs}[n] = \frac{1}{2}\left(y[n] + y^*[-n]\right)$ $\quad y_{cA}[n] = \frac{1}{2}\left(y[n] - y^*[-n]\right)$

$y[n] = -je^{-j\frac{5\pi}{2}n}$ $\quad y^*[-n] = je^{-j\frac{5\pi}{2}n}$

$$y_{cs}[n] = \frac{\left(-je^{-j\frac{5\pi}{2}n} + je^{-j\frac{5\pi}{2}n}\right)}{2} = 0$$

$$y_{cA}[n] = \frac{\left(-je^{-j\frac{5\pi}{2}n} - je^{-j\frac{5\pi}{2}n}\right)}{2} = -je^{-j\frac{5\pi}{2}n}$$

③ $x[n] = \{-2, 4, -1, 4\}$ $\quad 1 \le n \le 4, x[n] = 0$ else

$$\ell_1\{x[n]\} = \sum_{n=1}^{4}\left(|x[n]|^1\right)^1 \qquad \ell_p\{x[n]\} = \Sigma\left(|x[n]|^p\right)^{1/p}$$

$$= 2 + 4 + 1 + 4 = \boxed{11}$$

$$\ell_2\{x[n]\} = \sum_{n=1}^{4}\left(|x[n]|^2\right)^{1/2}$$

$$\sqrt{2^2 + 4^2 + 1^2 + 4^2} = \boxed{\sqrt{37}}$$

$$\ell_\infty = |x[n]|_{max} = \boxed{4}$$