ANSWER KEY

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Q.1 (a) $x(t) = MW\left[\text{sinc}(2Wt - 0.5) + \text{sinc}(2Wt + 0.5)\right]$

(b) $\frac{W}{2}$ Hz

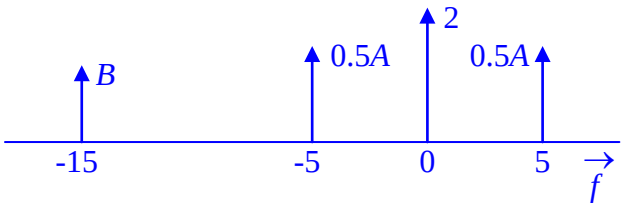
(c) $y(t) = M \cdot x\left(M\left(t - L\right)\right)$

Q.2 (a) $c_0 = 2, \quad c_{\pm 1} = 0.5Ae^{\mp j3\pi/10}, \quad c_{-3} = Be^{j2\pi/5}; \quad c_k = 0;$ for other k values

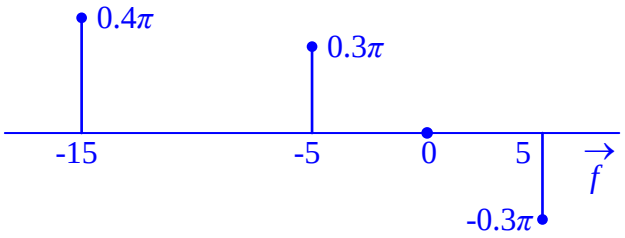
Average power of $x(t) = 4 + 0.5A^2 + B^2$

(b) $X(f) = 2\delta(f) + \frac{A}{2}e^{-j\frac{3\pi}{10}}\delta(f-5) + \frac{A}{2}e^{j\frac{3\pi}{10}}\delta(f+5) + Be^{j\frac{2\pi}{5}}\delta(f+15)$

Magnitude Spectrum $|X(f)|$



Phase Spectrum $\angle X(f)$



(c) Non-periodic. (Frequencies of sinusoids do not have a common factor)

(d) $Y(f) = \delta(f) + \frac{A}{8}e^{-j\frac{\pi}{2}}\delta(f-5) + \frac{A}{8}e^{j\frac{\pi}{2}}\delta(f+5)$
