Now, the ZT of $x_{int}[n]$ can be obtained as

$$X_{int}(z) = \sum_{n=-\infty}^{\infty} x_{int}[n]\, z^{-n}$$

$$= \sum_{n=-\infty}^{\infty} c[n]\, x[n]\, z^{-n} \quad \text{--- (4)}$$

By using (3),

$$X_{int}(z) = \sum_{n=-\infty}^{\infty} \left\{ \frac{1}{M} \sum_{k=0}^{M-1} e^{+jk\frac{2\pi}{M}n} \right\} x[n]\, z^{-n}$$

$$= \frac{1}{M} \sum_{k=0}^{M-1} \left\{ \sum_{n=-\infty}^{\infty} x[n]\, z^{-n} e^{+jk\frac{2\pi}{M}n} \right\}$$

$$= \frac{1}{M} \sum_{k=0}^{M-1} \left\{ \sum_{n=-\infty}^{\infty} x[n] \left(e^{-jk\frac{2\pi}{M}} z^{+1} \right)^{-n} \right\}$$

$$= \frac{1}{M} \sum_{k=0}^{M-1} X\left(e^{-jk\frac{2\pi}{M}} z \right) \quad \text{--- (5)}$$

Therefore, the ZT of $y[n]$ can be expressed by using (1) and (5) as

$$Y(z) = X_{int}\left(z^{1/M}\right)$$

$$= \frac{1}{M} \sum_{k=0}^{M-1} X\left(e^{-jk\frac{2\pi}{M}} z^{1/M} \right)$$

$$\Rightarrow \quad Y(e^{j\Omega}) = \frac{1}{M} \sum_{k=0}^{M-1} X\left(e^{-jk\frac{2\pi}{M}} e^{j\frac{\Omega}{M}} \right)$$

$$= \frac{1}{M} \sum_{k=0}^{M-1} X\left(e^{j\left(\frac{\Omega - 2\pi k}{M}\right)} \right)$$

or $$\boxed{Y(\Omega) = \frac{1}{M} \sum_{k=0}^{M-1} X\left(\frac{\Omega - 2\pi k}{M} \right)}$$

For $M=2$, $$Y(\Omega) = \frac{1}{2} \sum_{k=0}^{1} X\left(\frac{\Omega - 2\pi k}{2} \right) = \frac{1}{2}\left[X\left(\frac{\Omega}{2}\right) + X\left(\frac{\Omega - 2\pi}{2}\right) \right]$$

$$= \frac{1}{2}\left[X\left(\frac{\Omega}{2}\right) + X\left(\frac{\Omega}{2} - \pi\right) \right]$$