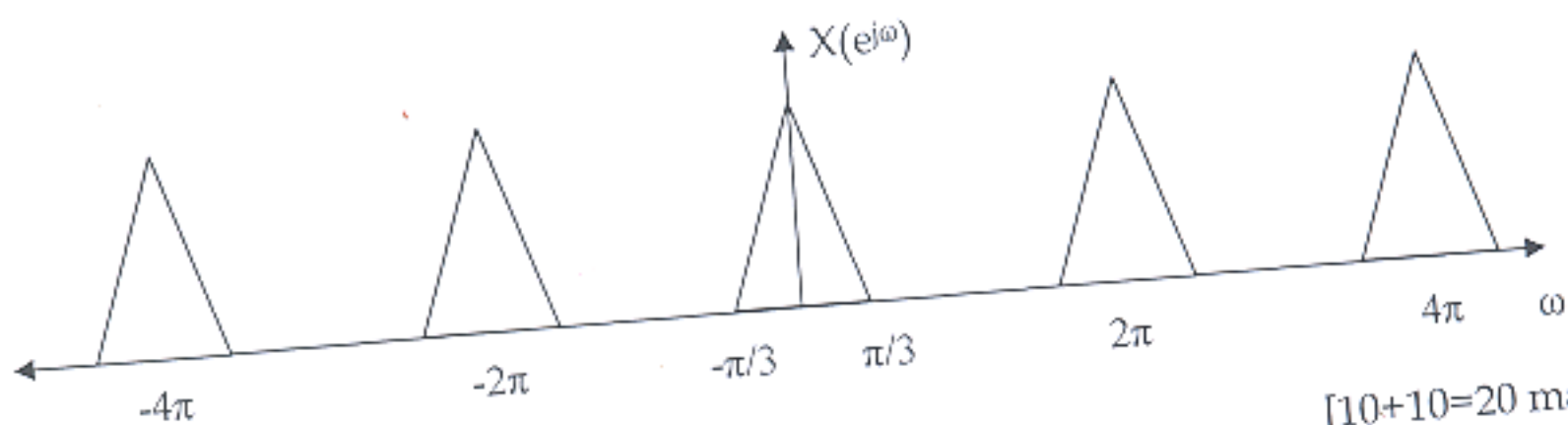18. a) Derive the frequency domain representation of an M-fold down sampled and an L-fold up sampled signal.

b) Consider a sequence $x(n)$ with $X(e^{j\omega})$ as shown. Let $y(n)=x(3n)$. Show how we can recover $x(n)$ from $y(n)$ using filters and multirate building blocks.

[10+10=20 marks]

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