

1.

$$\begin{array}{cccccccc} 1 & 0 & 2 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}$$

2. $2, 1, 0, 1, 0, 0, -1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0$

3. $(0, 2) (2), (0, 1) (1), (1, 1) (1), (1, 2) (-1),$
 $(9, 1) (1), (2, 0)$

4. $0 \mid 1000 \mid 1100 \mid 1010 \mid 1111000 \mid 1010$

5. $32 / (64 \times 8) = \underline{0.0625 \text{ Hz}}$