

1. Draw the constellation diagram for the following cases. Find 4 the peak amplitude value for each case and define the type of modulation (ASK, FSK, PSK or QAM). The numbers in parentheses define the values of I and Q respectively.
 - i. Two points at (3, 0) and (4, 0);
 - ii. Two points at (3, 0) and (-3, 0);
 - iii. Four points at (2, 2), (-2, 2), (-2, -2) and (2, -2);
 - iv. Two points at (0, 5) and (0, -5).

2. What is the number of bits per baud for the following 2 techniques?
 - i. ASK with four different amplitudes;
 - ii. FSK with eight different frequencies;
 - iii. PSK with four different phases;
 - iv. QAM with a constellation of 128 points.

3. What is the required bandwidth for the following cases if we 4 need to send 6000 bps. Let $d=1$. a) ASK, b) FSK with 4Khz difference between 2 carrier frequencies, c) QPSK, d) 16-QAM