

Important: You have to use **Acrobat Reader** to complete this task. Other PDF tools **will not work** (you may not see all the fields that you need to complete!).

Assignment specification for student 30270111

Instructions

This is **Lab Task 2**. It assesses your knowledge about **modulation**. You can get a total of 24 marks for this part. It is worth 6% of your overall unit marks.

For each task below, enter your solutions into the provided input fields. You can round numbers to two decimal places. Then save the PDF document and upload it to Moodle.

Click on the following link to open the submission page:

<https://lms.monash.edu/mod/assign/view.php?id=5870142>

Modulation A

Encoding table:

<i>Symbol</i>	<i>Frequency</i>	<i>Amplitude</i>	<i>Phase</i>
00	1 Hz	4.00	0.00°
01	1 Hz	4.00	180.00°
10	1 Hz	6.00	0.00°
11	1 Hz	6.00	180.00°

Tasks:

1. Draw a constellation diagram for the modulation scheme using Desmos. Enter the URL of your saved Desmos constellation diagram in the following field:
2. Enter the coordinates of each symbol in your constellation diagram in the table below. **Note:** Only numeric values are accepted, e.g., 2.83 is accepted, $2\sqrt{2}$ is not. (2 marks)

<i>Symbol</i>	<i>X</i>	<i>Y</i>
00		
01		
10		
11		

3. Draw a wave form for each symbol using Desmos. Tip: a frequency of 1 Hz corresponds to $2\pi x$ in the sine wave formula. Enter the URL of your saved Desmos symbols in the following field:
4. Sample the symbols specified in the table below at the given X coordinates (using the plots you made in step 3). You can easily do this in Desmos: plot the symbol, then click on the curve and drag the mouse pointer around. Desmos will display the X and Y coordinate of the point on the curve. Move the cursor until the X coordinate matches the one given in the table. Record the Y coordinate and enter it into the table (as above, only numerical values are accepted). (4 marks)

Symbol	X	Y
00	0.3	
	0.7	
01	0.3	
	0.7	
10	0.3	
	0.7	
11	0.3	
	0.7	

5. Demodulate the following message (Figure 1). Remember that one symbol corresponds to one time unit (i.e., one unit on the X axis) since the frequency is 1 Hz. (2 marks)

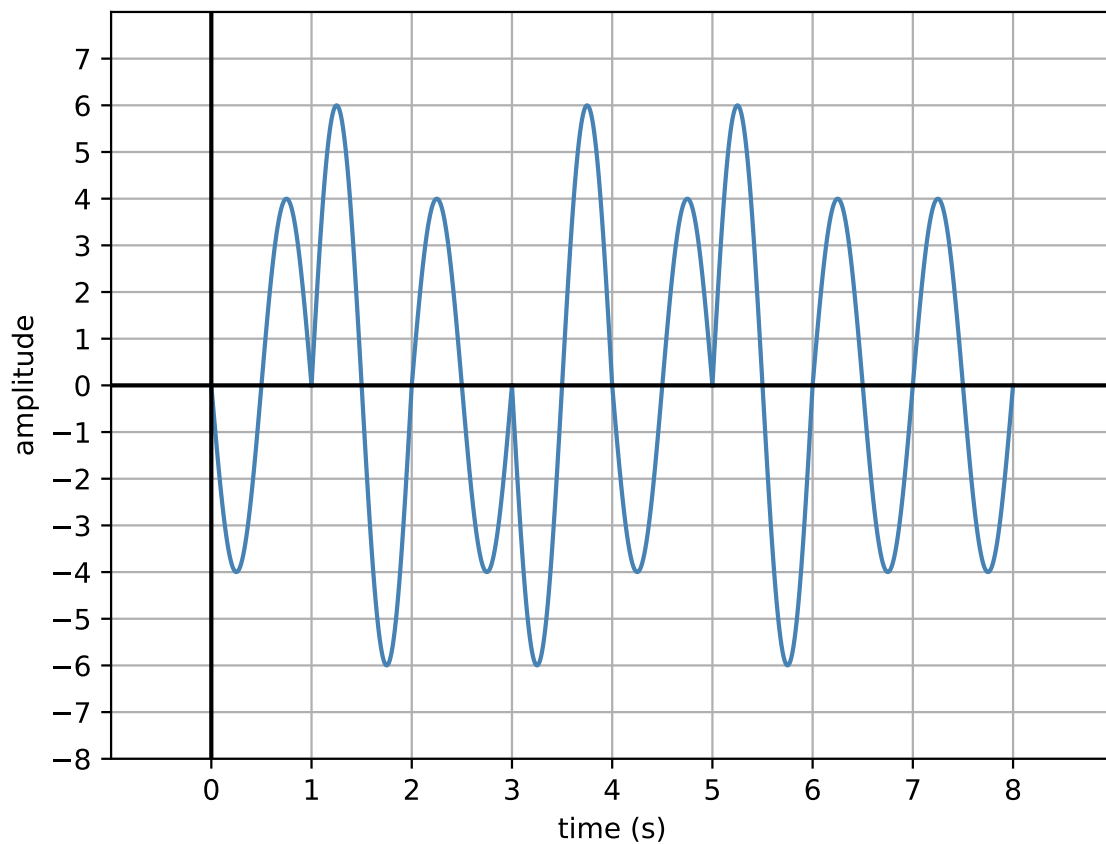


Figure 1: Plot of the message signal

Enter the demodulated message below.

You must enter the message as a simple sequence of 0 and 1, without spaces or commas between them (for example, 0001100100).

Modulation B

Encoding table:

<i>Symbol</i>	<i>Frequency</i>	<i>Amplitude</i>	<i>Phase</i>
0000	1 Hz	1.41	45.00°
0001	1 Hz	2.83	45.00°
0010	1 Hz	2.24	63.43°
0011	1 Hz	2.24	26.57°
0100	1 Hz	1.41	135.00°
0101	1 Hz	2.83	135.00°
0110	1 Hz	2.24	153.43°
0111	1 Hz	2.24	116.57°
1000	1 Hz	1.41	225.00°
1001	1 Hz	2.83	225.00°
1010	1 Hz	2.24	243.43°
1011	1 Hz	2.24	206.57°
1100	1 Hz	1.41	315.00°
1101	1 Hz	2.83	315.00°
1110	1 Hz	2.24	333.43°
1111	1 Hz	2.24	296.57°

Tasks:

1. Draw a constellation diagram for the modulation scheme using Desmos. Enter the URL of your saved Desmos constellation diagram in the following field:
2. Enter the coordinates of the following symbols of your constellation diagram in the table below: (8 marks)

<i>Symbol</i>	<i>X</i>	<i>Y</i>
0000		
0010		
0011		
0101		
0111		
1000		
1011		
1111		

3. Draw a wave form for each symbol using Desmos. Enter the URL of your saved Desmos symbols in the following field:
4. Sample the symbols specified in the table below at the given X coordinates (using the plots you made in step 3). (4 marks)

