Exp:7 Pre lab Questions

1) What is DPCM?

* Differential pulse code modulation is a signal encoder that uses the baseline of pulse code modulation but adds some functionalities based on the prediction of the samples of the signal.

2) What is the significance of prediction filter in DPCM?

* The DPCM system is suitable for digitalization and transmission of highly correlated signals. This quality of the system is provided by a prediction filter in the negative feedback loop. This prediction filter estimates the actual sample value based on one or more previous samples of input signal.

3). Mention the merits of DPCM

* Bandwidth requirement of DPCM is less compared to PCM

* Quantization error is reduced because of prediction filter.

* Numbers of bits used to represent one sample value are also reduced compared to PCM.

Past Lab Questions.

1. Define prediction error.

A prediction error can be defined as the mismatch between a prior expectation & reality.

2) Differentiate PCM and DPCM

PCM	DPCM
* Pulse code Modulation	* Differential pulse code Modulation
* In PCM, feedback is not provided	* While in DPCM feedback is provided.
* It has good signal to noise ratio	* While it has moderate signal to noise ratio.
* It is less efficient than DPCM	* It is more efficient than PCM

3) What is prediction gain? State its significance.

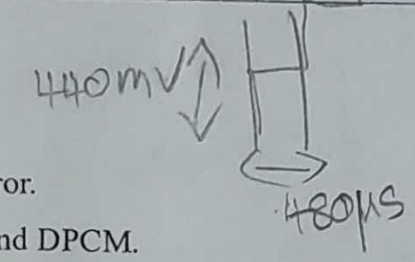
Prediction gain (ratio of desired signal power to error signal power in dB) for each ESN predictor model, M = 60, F = 12. Error signal power, over all utterances for each digit decreased after each iteration of the train procedure until convergence.

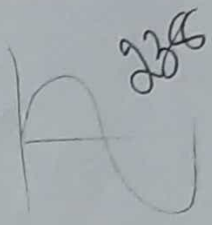
Modulation		
AC Input	Amplitude	Time Period
Clock – 1 Output	2V.	125KHz 8ms
Sample and Hold Output	5V	4KHz 0.25ms
DPCM Output	2.3V	800Hz 3ms.
	5V.	1KHz. 1ms

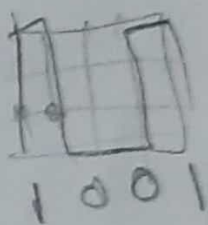
+ve → 0101010100010 ✓

-ve → 0100101011101

Demodulation		
	Amplitude	Time Period
DPCM Input	5V V	1KHz 1ms.
D/A Converter Output	2.5V	125Hz 8ms
LPF Output	1V	125Hz 8ms
Demodulated output Prediction Filter Output	2.5V	125Hz. 8ms





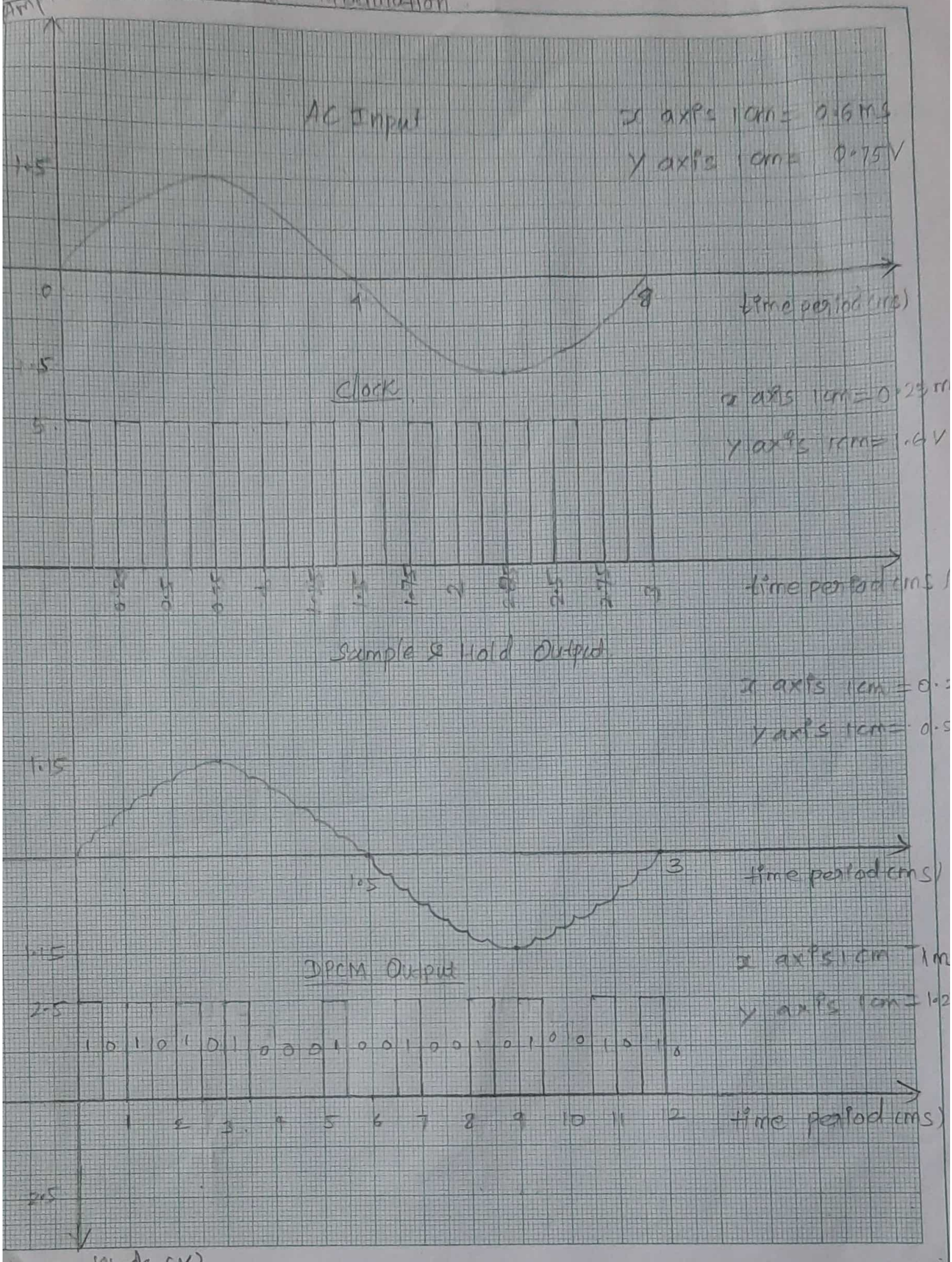


7.7 Post Lab Questions

1. Define prediction error.
2. Differentiate PCM and DPCM.
3. What is prediction gain? State its significance.

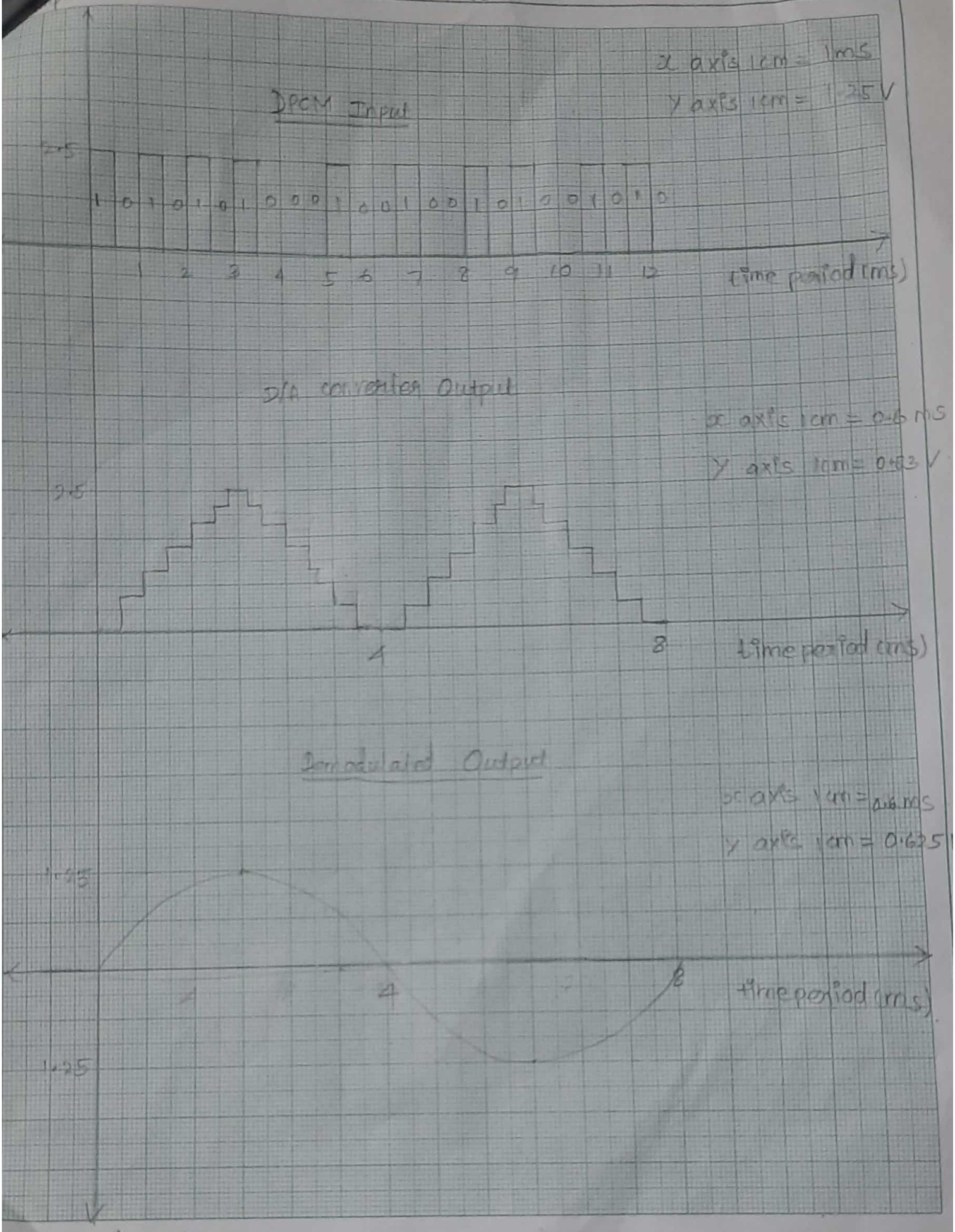
Amplitude (V).

DPCM Modulation



Amplitude (V)

DPCM Demodulation.



Amplitude (V).