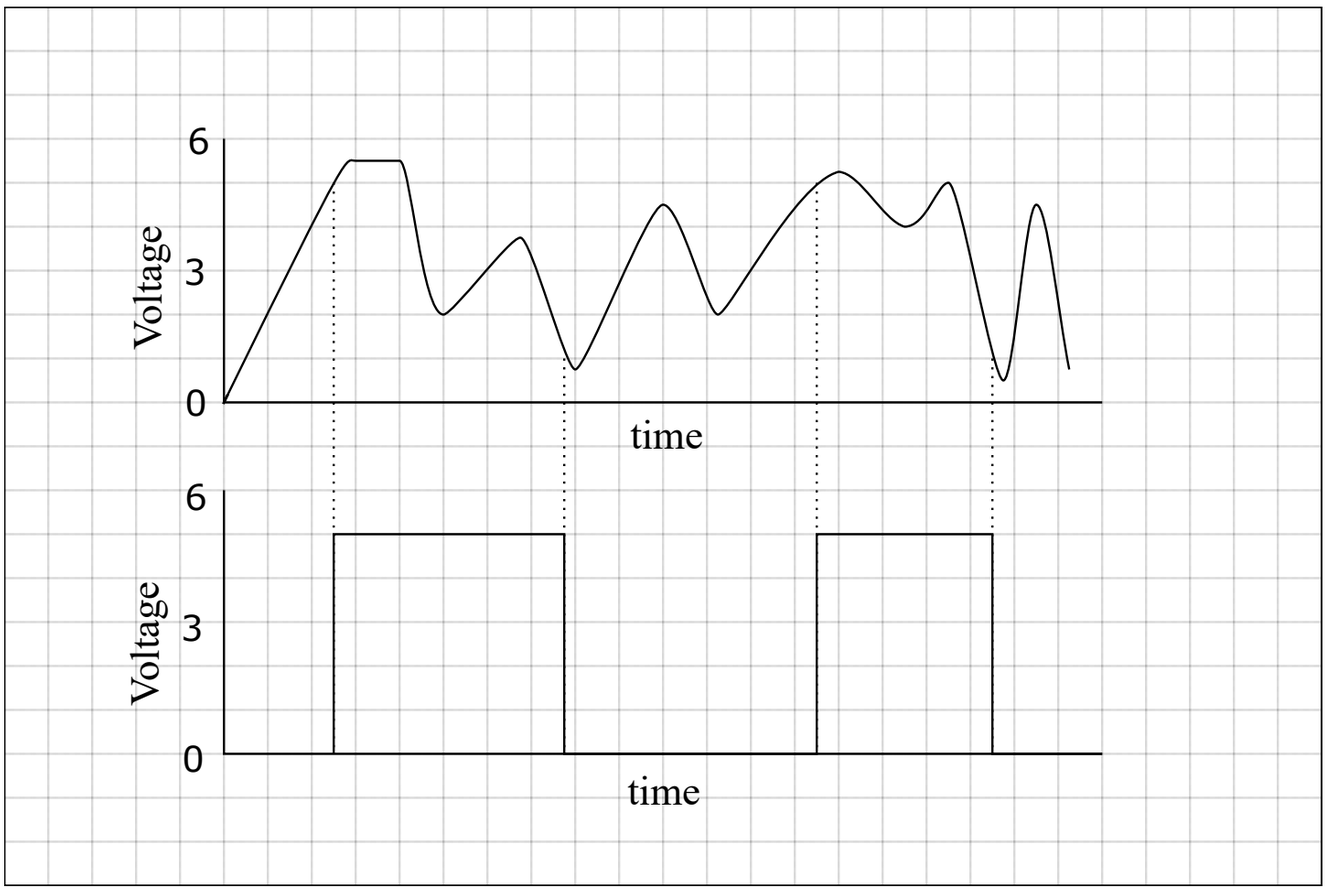
Class Test 4 **Date: February 22, 2023**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

Department of Computer Science and Engineering

L-3/T-1 CSE 315: Microprocessors, Microcontrollers, and Embedded Systems

1. Simon has a Schmitt trigger with an upper threshold of 5V and a lower threshold of 1 V. A noisy analog signal applied to the trigger is shown below. Draw the corresponding output of the trigger. (5)



2. Rodney wants to connect a speaker and a keyboard to his microprocessor using an 8255. The speaker works in simple I/O mode, whereas the keyboard transfers data using the single handshake protocol. Select the ports you choose for the devices and the corresponding control word. (5)

Speaker - PORT A; Keyboard - PORT B

D7	D6	D5	D4	D3	D2	D1	D0
1	0	0	0	x	1	1	x

Speaker - PORT B; Keyboard - PORT A

D7	D6	D5	D4	D3	D2	D1	D0
1	0	1	1	x	0	0	x

3. Jacob wants to interface a DRAM with his 80286 microprocessor. The DRAM has 512 rows, and it can retain data for 3 ms. The 80286 is a 10 MHz processor. Determine the loss of CPU time in percentage for the above-mentioned scenario showing all the steps of your calculation. (5)

$3ms = 3000\mu s$
$perrowrefresh = \frac{3000}{512} = 5.86\mu s$
$clockperiod = \frac{1}{10}\mu s = 0.1\mu s$
Assuming most of the instructions require one clock cycle,
$instructionsperrefresh = \frac{5.86}{0.1} = 58.6$
$wasteofCPUtime \approx \frac{1}{58} \times 100\% = 1.72\%$

4. Mark wants to interface an EEPROM having 13-bit wide address connections with the 8088. He wants the starting address of the EEPROM to be 2C000. Specify the address space of the EEPROM and complete the following connection diagram. (5)