EBU4202 Digital Circuit Design 2018-19
Week 4 Tutorial

1.a) Explain the difference and similarity between ROM and RAM.

b) Explain what is meant by the terms Static RAM (SRAM) and Dynamic RAM (DRAM) and compare them.

c) Using a suitable diagram, briefly explain the function of a DECODER.

d) Suppose we have a computer with 256 MBytes of memory, with each memory chip having a capacity of 4 MBytes.

i) How many memory chips are required?
ii) How many address bits are required?
iii) How many bits are required to select the memory chips?
iv) Draw a block diagram of a circuit using a decoder so that all 256 Mbytes of memory can be addressed.

2. a) Explain what is meant by each of the following terms:

i) Non-volatile

ii) Random Access

iii) DRAM

iv) EPROM

b) Mask programmed Read Only Memories (ROM) are programmed in manufacture. Using a suitable diagram, show the typical structure of a 4x4-bit ROM.

c) Design and draw the diagram of an Arithmetic Unit, which can add and subtract as well as can make it increment and decrement by 2.

3. (a) Draw the gate logic diagran of an half adder using NAND gates.

(b) Use a suitable diagram to explain how a 4-bit parallel ripple adder can be used as a subtractor, where you want to perform (N1-N2) operation.

4. Design an 8 x 4-bit read-only memory (ROM) circuit pre-programmed with the data shown in the Table below. (Hint: diodes, decoder, multiplexer etc. are required in the ROM circuit).

Address	Data (4 bit)
0	8
1	8
2	14
3	1
4	15
5	0
6	14
7	1

5. Using appropriate diagrams, briefly describe the use of ROM as a Look-up table, referring to an example.