**Exercise 1**

Note, in an exam you will be expected to show all working i.e. intermediate stages or results for each question.

**Question 1**

i. What are the three main building blocks of any computer?

ii. Why is a binary representation more suited to semiconductor based technologies?

iii. What is machine language and how does it differ from a high level language?

**Question 2**

i. What do the symbols ‘1111’ represent in binary, decimal and hexadecimal number formats?

ii. What is the advantage / disadvantage of moving to a high number base?

**Question 3**

i. Convert the decimal number 10, 33, 100 into unsigned 8 bit binary numbers.

ii. Using binary arithmetic perform the following calculations:
   a. 100 + 33
   b. 10 + 33

iii. What are the minimum number of bits required to represent these results?

**Question 4**

i. For the circuit diagram shown below
   a. List the logic gates used and their truth tables.
   b. Draw the truth table for this circuit showing its input (A, B, C_{in}) to output (Carry, Sum) relationship.
   c. What function does this circuit perform?
   d. Using a block diagram show how this component can be replicated to form larger circuits.
   e. What is the critical path delay of this circuit?