Question 1.

- For each of the following decimal values, give the equivalent power of 2 representation.
- (i) 65536.
 - 2¹⁶
- (ii) 1 048576
 - 2²⁰
- (iii) 512.
 - 2⁹

Question 2.

• (i) Perform the following two's complement operation.

01001110

- 11110100

01001110

+ 00001100

01011010

(ii) Convert the result in (i) to the decimal base.

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$$2^6 + 2^4 + 2^3 + 2^1 = 64 + 16 + 8 + 2 = 90$$

- (iii) Convert the result in (i) to the hexadecimal base.
 - 5A

Question 3.

- Consider the floating-point value +110001.010×2⁰ represented in the scientific notation. Show it in a normalized 32-bit IEEE format.
 - +1.10001010×2⁵

• Exponent: 00000101 + 01111111 = 10000100

S	E								F																						
0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Question 4.

• Consider the Hamming code. Calculate the number of checkbits (i.e. error bits) required for a 64-bit word.

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$$m + r + 1 \le 2^r \Rightarrow 64 + r + 1 \le 2^r \Rightarrow r = 7$$