

1. (a) Explain the difference between value and representation, giving an example. [3]
- (b)
 - i. Convert 48_{10} to an unsigned binary number. [2]
 - ii. Show how -22_{10} can be represented using two's complement. [2]
 - iii. Show how 22_{10} can be subtracted from 48_{10} using two's complement. [3]
 - iv. Explain the concept of overflow in binary arithmetic, giving an example. [3]
- (c)
 - i. Convert 4180_{10} to octal. [3]
 - ii. Convert 1111101001101011_2 to hexadecimal. [3]
 - iii. State whether $D2AF_{16}$ is a valid hexadecimal value. Justify your answer. [2]
- (d) Explain the difference between fixed point and floating point binary representation. Comment on the achievable precision and range of each representation. [4]