1. Describe two differences between I2C master and slave devices?

The differences between the I2C master and slave are that master devices initiate communication while slave devices receive communication (some slave devices can respond to a master device but still can't initiate conversation), each slave is unique while master devices connect to multiple slave devices in order to perform multiple tasks. (some devices can switch between master and slave modes)

2. What are the two connections in an I2C bus? Describe their purpose.

The two connections in an I2C bus are SDA (serial data) and SCL (serial communication). SCL is used by the master device to send clock transitions to the slave device. SDA is used by both the master and the slave device to produce data.

3. What is the difference between open-drain and push-pull outputs?

Open-drain can only pull the signal line low and cannot cause damaging faults, while push-pull has two devices attempting to output different states to one wire which can short a circuit if to much current gets passed through.

4. What is the purpose of the I2C restart condition?

The purpose of the restart condition is to allow the master to write and read from a slave. To do this the current read/write on a slave must be ended so the new communication can start.

5. What peripheral register would you use to set the read/write direction of the next I2C transaction?

To read/write direction of transaction you would use the I2C_CR2 register (control register 2) with the RD_WRN bit.

6. The 10-bit SADD bit-field holds the slave device address. Since standard I2C addresses only use 7 bits, to which bits in the bit-field would you write the shorter address?

You would use the 7 bits 1-7 making sure that bits 0 8 and 9 are clear when making shorter address to write.