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State	Finished
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Time taken	11 hours 12 mins
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

Which architecture provides separate buses for program and data memory?

Select one:

- a. None of the mentioned
- b. Princeton architecture
- c. All of the mentioned
- d. Harvard architecture ✔

Correct answer.
In Harvard architecture, there are two completely separate memory systems: each has its own data and address bus.

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00.

Question **2**

Correct

Mark 1.00 out of 1.00

What do the acronyms CISC and RISC stand for?

Select one:

- a. Complete Instruction Set Computer, Reduced Instruction Set Computer
- b. Complex Instruction Set Computer, Reduced Instruction Set Computer ✔

Correct answer.

CISC stands for Complex Instruction Set Computer while RISC stands for Reduced Instruction Set Computer. CISC has the capacity to perform multi-step operations or addressing modes within one instruction set while RISC utilizes a small, highly-optimized set of instructions, rather than a more specialized set of instructions

- c. Complete Instruction Set Computer, Reliable Instruction Set Computer
- d. Complex Instruction Set Computer, Reliable Instruction Set Computer

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00.

Question **3**

Correct

Mark 1.00 out of 1.00

Which architecture (regarding buses for program and data memory) is called von Neumann architecture in Germany?

Select one:

- a. Princeton architecture ✔

Correct answer.

The **Princeton architecture** is also called **von Neumann architecture** in Germany, also known as the **von Neumann model**.

- b. None of the mentioned
- c. Harvard architecture
- d. All of the mentioned

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00.

Question **4**

Correct

Mark 1.00 out of 1.00

What is called oversampling?

Select one:

- a. Only measuring very often, without multiplying of the results
- b. Measuring one time, and dividing by the resolution of the ADC
- c. Measuring very often, summing the results and dividing in the end ✔

Correct answer.
Oversampling is used in order to get higher resolution. For example, our microcontroller has 10-bit ADC, with oversampling it is possible to get 12-bit resolution. It is done by measuring very often, summing the results and dividing in the end.

- d. Measuring very often, multiplying of the results and dividing in the end

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00.

Question **5**

Correct

Mark 1.00 out of 1.00

ADC Oversampling: Which number of samples is (at least) necessary in order to get 2 additional bits of resolution?

Select one:

- a. 1024
- b. 2
- c. 4
- d. 16 ✔

Correct answer.
In general, for additional n bits of resolution, you will need the following number of samples:

number of samples = 2^2n

Oversampling is used in order to get higher resolution. For example, our microcontroller has 10-bit ADC, with oversampling it is possible to get more or less reliably the resolution of 12-bits. It is done by measuring very often, summing the results and dividing in the end.

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00.

Question **6**

Correct

Mark 1.00 out of 1.00

Which of the following are the core components of a microcontroller?

Select one:

a. ADC, ALU, RAM, clock, I/O ports

b. ALU, RAM, ROM, clock, I/O ports ✔

Correct answer.

The core features of a microcontroller are ALU, RAM, ROM, clock, I/O ports. Other peripherals that may be included in a microcontroller are Watchdog timers, Interrupts, ADC, Interfaces, etc.

c. ADC, ALU, ROM, clock, I/O ports

d. ADC, RAM, ROM, clock, I/O ports

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00.

Question **7**

Correct

Mark 1.00 out of 1.00

Read the datasheet and find out what is the best reference voltage setting of the ADC for the temperature sensor.

Select one:

a. 5V, ADMUX = (1 « REFS1) | (1 « MUX3);

b. 5V, ADMUX = (1 « REFS0) | (1 « MUX3);

c. 1.1V, ADMUX = (1 « REFS0) | (1 « REFS1) | (1 « MUX3); ✔

Correct answer.
1.1V; In order to enable it, REFS0, REFS1 and MUX3 bits should be set to 1 in ADMUX register.

d. 230V, ADMUX = (1 « REFS1) | (1 « MUX1);

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00.

Question **8**

Correct

Mark 1.00 out of 1.00

What is the difference between UART and USART communication?

Select one:

a. One uses asynchronous means of communication and the other uses asynchronous and synchronous means of communication ✔

Correct answer.

UART stands for Universal ***Asynchronous*** receiver-transmitter and USART stands for Universal ***Synchronous and Asynchronous*** receiver-transmitter

b. They are the names of the same particular thing, just the difference of A and S is there in it

c. One uses angular means of the communication and the other uses linear means of communication

d. One uses asynchronous means of communication and the other uses synchronous means of communication

Your answer is correct.

Correct

Marks for this submission: 1.00/1.00.

Question **9**

Correct

Mark 1.00 out of 1.00

How many 16-bit temperature values can be stored in the 24C02 EEPROM (provide a decimal number)? For the meta-data (time/date/size) 6 bytes are used.

Answer: 125 ✔

The size of the memory is 2048 bits or 256 bytes. 6 bytes are used for the so-called meta-data (time, date and size). The number of 16-bit values (2 bytes) that can be stored in memory module is therefore 125 (250/2=125).

Correct

Marks for this submission: 1.00/1.00.

Question **10**

Correct

Mark 1.00 out of 1.00

Multiple devices are connected via I2C communication. Is this a problem?

Select one:

- True
- False ✔

Right answer, I2C is a bus and not only a communication protocol (for interconnection of two devices).

You can connect (in theory) up to 128 different devices to the TWI / I2C bus.

Correct

Marks for this submission: 1.00/1.00.

◄ Lab 5

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