***Advanced System on Chip Course***

**QUIZ 1**

**Issue 1.0**

# MODULE 1: Introduction to Arm-Based System on Chip Design

**Question 1:**

The widespread use of semiconductor technologies is a result of which of the following factors?

1. Cheaper fabrication cost per function.
2. Developing high-performance transistors.
3. The automation of the IC design processes.
4. All of the above.

**Question 2:**

What is one of the reasons why on-chip integration is so important in the present day for the electronics industry?

1. Because chips have to be operated at higher clock-frequencies.
2. Because the evolution of semiconductor technology cannot produce further die shrink.
3. Because cost, area and power consumption is now as important as clock-frequency if not more important in the implementation of many electronic devices.
4. Because chip applications are being standardized.

**Question 3:**

Which of the following issues are typically addressed at the specification stage of the SoC design process?

1. The analysis of crosstalk noise.
2. Static timing analysis for digital blocks.
3. The identification of the operation modes of the system.
4. None of the above.

**Question 4:**

Which of the following definitions best describes what a SoC (System on Chip) is?

1. It is a single silicon chip that can be used to implement the functionality of an entire system.
2. It is a single board system that has been completely implemented with integrated circuits.
3. It is a single silicon chip that encloses a microprocessor.
4. It is a single silicon chip aimed to embedded applications.

**Question 5:**

Which of the following characteristics are limitations of systems on chips?

1. Lack of power efficiency.
2. Large area overhead.
3. Degraded performance.
4. Complex design process.

**Question 6:**

Which of the following statement is incorrect?

1. A SoC has higher performance than an MCU.
2. A SoC may contain multiple memory cores while MCU typically has a single memory core.
3. An MCU is capable of running numerous operating systems while a SoC does not typically have this capability.
4. An MCU is typically used for basic embedded applications while SoCs are used in complex application such as smartphone.

**Question 7:**

In the SoC design flow, what is typically the outcome of hardware/software partitioning?

1. It reduces the complexity of the design process.
2. It enables to perform software simulations of the SoC before the hardware has been designed.
3. It eventually produces a SoC with optimized balance between performance and cost/power/area.
4. It simplifies the verification stage.

**Question 8:**

Which of the following techniques do NOT help decrease the design-productivity gap?

1. The use of third parties IP cores.
2. Design automation.
3. Recruiting more design engineers.
4. Using more advanced fabrication technologies.

**Question 9:**

 Which of the following issues are NOT addressed at the prototyping stage of the SoC design process?

1. Placement and routing.
2. Synthesis.
3. Definition of the interface between hardware and software.
4. Simulations of the software.

**Question 10:**

Which of the following definitions best describes what a PSoC (Programmable System on Chip) is?

1. It is a SoC that can be programmed by software since it contains a microprocessor.
2. It is a chip that combines a processing system based on one or more processors with a reconfigurable logic fabric and a communication bus.
3. It is a SoC that encloses only software-programmable modules.
4. It is just another name for an FPGA.

**Question 11:**

Which of the following statements is NOT correct?

1. SoC is typically built using cores from different vendors.
2. Testing a SoC requires hardware/software co-simulation.
3. SoC is normally developed for a specific application.
4. The SoC hardware components can be easily replaced if faulty.

**Question 12:**

 Which of the following statements is NOT correct?

1. This SoC verification stage is an iterative process.
2. The SoC verification sometime requires additional software development.
3. The SoC verification sometime requires additional hardware optimization.
4. This SoC verification stage is typically performed after device fabrication.

**Question 13:**

Typically, what are the basic components of a SoC?

1. A CPU, a graphics processor, and general-purpose I/O blocks.
2. A CPU and internal memory modules.
3. A system manager such as a microprocessor, system peripherals and coprocessors, and a system bus.
4. Various microprocessors and a system bus.

**Question 14:**

Why are FPGAs often used for system prototyping in the SoC design flow?

1. Because FPGAs show better performance than an ASIC.
2. Because FPGAs consumes less power than a dedicated silicon chip.
3. Because FPGAs enable to exactly reproduce the signal routings and propagation delays that the final dedicated silicon SoC will have.
4. Because FPGAs are flexible and reconfigurable platforms that enable functional co-verification of both hardware and software.

**Question 15:**

What is the main difference an IP vendor from a fabless vendor?

1. An IP vendor fabricates its own chips while a fabless vendor just designs hardware cores.
2. An IP vendor is only a chip retailer while a fabless vendor just designs hardware cores.
3. An IP vendor is a software core developer while a fabless vendor is concerned with hardware design.
4. An IP vendor designs silicon IPs and sells licenses to use them and fabless vendors normally use those IPs to develop semiconductor chips that later a fabricated in semiconductor foundries.

**Answers**

Q1)4

Q2)3

Q3)3

Q4)1

Q5)4

Q6)3

Q7)2

Q8)4

Q9)3

Q10)2

Q11)4

Q12)4

Q13)3

Q14)4

Q15)4