PRESIDENCY UNIVERSITY
BENGALURU

SET A

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024

Semester : Semester VII - 2020
Course Code : ECE3048
Course Name : Fpga Design for Embedded Systems
Program : B.Tech.

Date : 0Í -JAN-2024
Time : 9:30AM - 12:30 PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS   5 X 4M = 20M

1. Soft core processor are more useful in terms of implementation and verification. Mention the various advantages the soft processor have list them in details? Soft processor have many unique Advantages

    (CO1) [Knowledge]

2. If we need a little logic to implement, we will choose CPLD and for a complex function we will use FPGA. There are many markets player to provide the solution for the same. Mention four popular vendors who provide FPGA.

    (CO2) [Knowledge]

3. In competitive environment, chip development cycles are compressed, causing design teams to reuse semiconductor Intellectual Property(IP) Ccres to accelerate time to market. List the types of Ip core available and classify them correctly?

    (CO3) [Knowledge]

4. While designing a FPGA project DE10-Lite evaluation kit can be used to start . Describe the detail features of DE10 Lite kit and also mention the peripherals connected to the FPGA device . Name a FPGA board which is integrated in this Kit

    (CO3) [Knowledge]

5. CPLD ,FPGA and ASIC are the three programable devices available for embedded designers. Mention the parameters that can be used to compare them to help the designer to reach a final decision which is more suitable for the design?

    (CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS   **5 X 10M = 50M**

6. CEO claims the very famous Moore's law dating back in 1960 is still alive while the dominating company Nvidia claims that Moore's law has ended. With this specify the selection of devices plays a key role for designer to decide which FPGA is more suitable for his implementation. What are the criteria to be followed to select the FPGA from different vendors?

(CO1) [Comprehension]

7. Once we create soft core processor it's the most important part is programming a soft-core processor.
   (a) Mention the various software platforms available to programme softcore processor. [2]
   (b) Name the software interface available in Quartus prime to program soft core processor. [2]
   (c) List the difference between embedded programming and application programming for embedded systems. [6]

(CO2) [Comprehension]

8. Embedded systems are programmed using embedded programming. Define embedded systems. With the help of system level architecture describe the embedded systems. List the various operating systems available for specific applications such as agriculture and medical applications

(CO3) [Comprehension]

9. AND and OR logic can be used to implement digital logic, with a single level of programmability.
   (a) Name the programmable device that consists of a programmable "wired" AND-plane that feeds fixed OR gates. [2]
   (b) Using the same logic identified above in (a), Implement the boolean function F1=A.B.C'+A'.B.C and F2=A'B'+A.B.C[8]

(CO3) [Comprehension]

10. Hardware programmability is one of the big achievements in the field of hardware design. Programable memory has significantly contributed in the development of the programmable logic devices.
    (a) Mention the programmable device that consisting of a programmable "wired" AND-Programable OR-gates. [2]
    (b) Implement the F1=A.B.C'+A'.B.C and F2=A'B'+A.B.C [8]

(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS   **2 X 15M = 30M**

11. As an embedded designer you have come across many hardcore processors which you can program for any application.Due to the demand in embedded applications and their use in IoT application the softcore processor is also getting their popularity.
    (a) List four soft core processor available in market? [4]
    (b) List any six parameters to compare their performance?[6]
    (c) List the features of Intel soft core processor?[5]

(CO2) [Application]

12. EDA tools helps to create VLSI design in reality and also make it easy job to handle the Timing constraints and RTL design. These tools need to follow a systematic design flow of to achieve the great design. If you are a VLSI designer and you have been asked to create a prototype of the device
    List various design modelling styles used in VLSI design?[3]
    Explain the VLSI design flow in detail to final implementation on FPGA?[12]

(CO4,CO3) [Application]