


 U.S.N

--	--	--	--	--	--	--	--	--	--

P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

First Semester, M. Tech. – Electronics and Communication Engineering (MECE)
(VLSI Design and Embedded Systems)

Semester End Examination; Jan/Feb. - 2016

SOC Design

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- | | | |
|------|---|---|
| 1 a. | What are the typical goals used in SOC design? Explain them. | 6 |
| | b. Why scaling of MOSFET necessary? Explain constant field scaling and their effect on drain current and power dissipation. | 8 |
| | c. Explain the various factors that are driving the industry to develop SOC. | 6 |
| 2 a. | Briefly explain the principle of system on chip with respect to power and performance. | 6 |
| | b. Define system on board and system on chip and differentiate them. | 8 |
| | c. What is a design productivity gap? Suggest some ways to bridge the productivity gap. | 6 |

UNIT - II

- | | | |
|------|--|----|
| 3 a. | Illustrate the differences between Von-Neumann and Harvard architecture. | 8 |
| | b. Differentiate between microprocessor and microcontrollers. | 6 |
| | c. Write short notes on interrupt architectures. | 6 |
| 4 a. | Briefly explain and mention its advantages : | |
| | i) Cache memory | 12 |
| | ii) Scratch pad memory | |
| | iii) Flash memory. | |
| | b. Explain the concept of directory based coherence. | 4 |
| | c. Explain MESI protocol for cache - coherency. | 4 |

UNIT - III

- | | | |
|------|---|----|
| 5 a. | What are the types of data transfer modes? Mention its advantages and disadvantages. | 10 |
| | b. What is the need for hardware accelerators in SOC? What are the trade offs in implementing these functionalities in SOC? | 10 |
| 6 a. | Explain in detail direct and hybrid network topologies. Compare them. | 8 |
| | b. Write short notes on packet switching and worm hole routing. | 8 |
| | c. Write short note on mesh based NOC. | 4 |

UNIT - IV

- | | | |
|------|--|---|
| 7 a. | Explain the block diagram of Hartley image rejection receiver. And how the image band is rejected, explain it. | 8 |
|------|--|---|

- b. What are the different data converters used in SOC? Explain any one ADC used in SOC. 8
- c. Write short notes on Amplifiers need in SOC design. 4
- 8 a. What is the need for power management in SOC? What are the different sources of power dissipation? 10
- b. Explain the necessary operation of RF Transmitter and receiver circuits in detail. 10

UNIT - V

- 9 a. Describe the fundamental issues involved in Hardware - Software co design. 10
- b. With a neat flow chart explain the high level verification for an SOC design. 10
- 10. Write short notes on the following :
 - a) DRAM
 - b) ESL design flow 20
 - c) VSB controller
 - d) RISC and CISC comparison.

* * *