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A – 4197

Reg. No. :

Name :

**Fourth Semester B.Tech. Degree Examination, June 2016
(2013 Scheme)**

13.402 : COMPUTER ORGANIZATION AND DESIGN (FR)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions, **each** question carries **4** marks.

1. a) Explain the function of following registers of the processor.
 - i) MAR
 - ii) PC
 - iii) MDR
 - iv) IR.
- b) Write an assembly language program for addition of 'n' nos. stored in the memory using auto increment mode.
2. a) Explain the different types of micro operations often encountered in a digital system.
- b) Draw the hardware implementation of the statement. If X is even $A \leftarrow B + C$ else $A \leftarrow (B \bullet C)$. Assume A, B, C and X are 4 bit registers.
3. Explain each method of control organization in detail.
4. a) A computer system has a main memory consisting of 1 M 16 bit words. It also has a 4 K word cache organized in a block set associative manner with 4 blocks per set and 64 words per block. Calculate the no. of bits in each tag, set and word fields of the main memory address format.
- b) With a neat diagram explain the construction of magnetic hard disk, organisation and accessing of data on disk.
5. Explain the two types of bus arbitration with required diagram.



P.T.O.



PART - B

Answer **one full** question from **each** Module, **each full** question carries **20** marks.

Module - I

6. a) Discuss different addressing modes (with examples) used in a RISC processors.
- b) How are subroutine calls implemented ? What is the role of the processor stack ?
- c) Explain the concept of bus structures. How is address, data and control information handled in a bus ?
7. a) Represent decimal value of 5, -2, 14 in following format :
- Sign and magnitude
 - 1's complement
 - 2's complement.
- b) Explain following with example :
- Register transfer notation
 - Assembly language notation.
- c) Explain the big-endian and little-endian addressing with diagrams.

Module - II

8. a) Explain how all the arithmetic operations are obtained when one set of inputs are given to a parallel adder controlled externally in the design of arithmetic circuit.
- b) Explain the bits C, S, Z and V in a status register. Give the required condition of status bits for the subtraction operation of unsigned numbers (A - B).
9. Draw and explain the block diagram of a processor unit.



Module - III

10. Explain the 5 stages of the design of a hardwired control with an example.
11. Explain the microprogram control along with its hardware configuration and microprogram.

Module - IV

12. a) Explain serial interface with diagram.
b) Define exception. Explain different types of exceptions with example.
c) Explain direct cache mapping with example.
13. a) Illustrate the implementation of an output interface for a display device. Explain function of each signal handled by the interface.
b) Draw the timing diagram for read operation on PCI.

