PRACTICE SET

End Semester Examination, December- 2025

Program: B. Tech III (CSE) **Course: Computer Organization and Architecture**
Course Code: 3PCCCS202 **Semester: Third**

Course Outcome:

- CO1 -Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
- CO2- Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
- CO3- Write a flowchart for Concurrent access to memory and cache coherency in Parallel Procssors and describe the process.
- CO4-Design a memory module and analyze its operation by interfacing with the CPU.
- CO5-Assess its performance, and apply design techniques toenhance performance using pipelining, parallelism and RISC methodology

UNIT-1

Section: I (5 Marks, only Lower order Thinking -LOT)

1. Compare computer organization and computer archictecure on various parameters. [CO1,understand]
2. Present a diagrammatic view of an instruction cycle explaining its various stages. [CO1, understand]
3. Illustrate opcode and operand in an example instruction. Draw suitable instruction format. [CO2, understand]
4. Explain the concept of RTL instruction. [CO2, understand]

Section: II (10 Marks, both LOT & HOT)

5. Discuss about the following types of registers: Accumulator, Programme counter, GPRs & IR. [CO1, understand]
6. Explain the two representation schemes for integers. [CO2, understand]
7. What are the ranges of 8-bit, 16-bit, 32-bit and 64-bit integer, in "unsigned" and "signed" representation? [CO2, understand]

8. Give the value of +88, -88 , -1, 0, +1, -128, and +127 in 8-bit 2's complement signed representation. [CO2, evaluate]
9. Give the value of +88, -88 , -1, 0, +1, -127 and +127 in 8-bit 1's complement representation. [CO2, evaluate]

Section: III (20 Marks, only Higher Order Thinking- HOT)

10. Explain the working of 4-bit ripple carry adder using logic gates. Also, enumerate its disadvantages. [CO2, analyze]
11. Explain 4-Bit Carry Look-ahead Adder. Draw truth table along with circuit diagram. [CO2, analyze, evaluate]

UNIT-II

Section: I (5 Marks)

12. Compare direct and indirect addressing modes. [CO1, understand]
13. Give a comparison of macro instruction and micro instruction. [CO1, understand]

Section: II (10 Marks)

14. Describe why do the architects use the addressing mode technique. Compare immediate and direct addressing modes. [CO1, understand]
15. Discuss the following addressing modes: a. Register addressing b. Relative addressing [CO1, analyze]
16. Write an assembly language program to derive the expression X = (A+B) – (C+D) for a register based CPU. [CO3, evaluate]
17. The memory unit of a computer has 256 K words of 32 bits each. The computer has an insruction format with four fields: an operation code, a mode field to specify one of seven addressing modes, a register address field to specify one of 60 processor registers and a memory address. Specify the instruction format and the nimber of bits in each field if the instruction in one memory word. [CO3, evaluate]
18. Write about a. Data transfer instructions b. Control transfer instructions. c. Privileged and non-privileged instructions. [CO1, remember & understand]

Section: III (20 Marks)

19. With a neat schematic, Explain about DMA controller and its mode of data transfer. [CO4, analyze]
20. Write short notes on: a. USB b. SCSI c. I/O sub system d. I/O controller [CO4, understand & analyze]
21. Explain the working of hardwired CU design in detail. [CO4, analyze]
22. Write a program to evaluate the arithmetic expression: [CO3, evaluate]
    X = (A-B)*((C-D)/F/G)
    a) Using a general register computer with three address instruction
    b) Using a general register computer with two address instruction

c) Using an accumulator type computer with one address instruction
d) Using stack organized computer with zero address instruction

UNIT-III

Section: I (5 Marks)

23. Explain the concept of pipelining with suitable example. State its advantage over non-pipelined structure? [CO4, understand]
24. List the five levels of widely practiced parallelism used in a computer. [CO4, remember]
25. Define a. clock frequency b. Pipeline bubble [CO4, understand]
26. Discuss the concept of Associative memory. [CO4, understand]
27. Explain the mathematical derivation of performance gain due to pipeline. [CO4, apply]

Section: II (10 Marks)

28. Explain the four stage of instruction pipelining of four different instructions. [CO4, understand & analyze]
29. What is cache coherence issue? Explain the various solutions that are implemented to overcome this issue. [CO3, analyze]

Section: III (20 Marks)

30. Explain pipeline hazard. Describe the issue of data dependency and illustrate data dependency for a six stage pipeline for the following two successive instructions.
    Add R1, R2
    Sub R1, R2 [CO4, apply]
31. Explain the varius types of data dependency hazard. Give suitable example for each. [CO4, evaluate]

UNIT-IV

Section: I (5 Marks)

32. Discuss about the two semiconductor RAM menmories. [CO3, remember]
33. Draw the memory hierarchy and provide a comparative study of various levels of the hierarchy on the parameters of access time, storage capacity. [CO3, understand]
34. Enumerate the two principles of cache memory. [CO3, understand]
35. Discuss about the various types of ROM. [CO3, understand]
36. Elaborate the two techniques of cache write policy. [CO3, understand]

Section: II (10 Marks)

37. Discuss the various design issues in cache design. [CO4, analyze]
38. Explain the method to measure the performance of cache memory. [CO3, apply]
39. Explain the concept of memory interleaving and Instruction prefetch. [CO4, analyze]

Section: III (20 Marks)

40. Discuss the Flynn's classification of processors in the features of different levels in detail. [CO4, compare & analyze]
41. Discuss the three commonly used cache replacement algorithms applying proper example(s) for each one. [CO4, apply]

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Disclaimer: -This is a Practice Set. The Question in End term examination will differ from the Practice Set. This Practice Set is meant for practice only.