

R18

Code No: 153AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, February - 2024

COMPUTER ORGANIZATION AND ARCHITECTURE

(Computer Science and Engineering- Artificial Intelligence and Machine Learning)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) Define the term computer organization. [2]
- b) What is the purpose of a program counter, accumulator and an instruction registers? [3]
- c) What is meant by a microprogrammed control unit? [2]
- d) Draw and discuss the format of an microinstruction for the control. [3]
- e) What is meant by normalized floating point number and biased floating point number? [2]
- f) Convert the hexadecimal number F3A72C to decimal, binary and octal. [3]
- g) What do you mean by locality of reference? [2]
- h) What is the difference between access time and cycle time of a memory? [3]
- i) Define cache coherence. [2]
- j) Compare RISC and CISC instructions. [3]

PART – B

(50 Marks)

- 2.a) Draw the block diagram of a Digital Computer and explain the functionality of each Component.
- b) With examples, explain the different logic operations that can be performed with two binary variables. [5+5]

OR

- 3.a) Draw and explain the function of a 4-bit adder-subtractor circuit.
- b) Explain various memory reference instructions providing examples for each. [5+5]
- 4.a) What is a control unit? Explain the design and implementation of control unit.
- b) Discuss different addressing modes used in computer system. [5+5]

OR

- 5.a) Provide examples to illustrate zero-address, one-address and two-address instructions.
- b) With neat block diagram, explain the operation of a micro-sequencer. [5+5]
- 6.a) Explain BCD addition and subtraction with a neat circuit diagram and example.
- b) Explain r's complement and (r-1)'s with an example. [6+4]

OR

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7.a) Multiply the following pairs of signed 2's complement numbers using Booth's algorithm:
Multiplicand = 110011 and Multiplier = 101100.

b) Illustrate signed-magnitude and signed-1's complement representation of a number with an example. [6+4]

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8.a) With a neat diagram, discuss the working of priority of interrupt hardware circuit using priority encoder.

b) Explain the hardware organization of an associative memory with the help of a diagram. [5+5]

OR

9.a) Explain about input-output interface.

b) Explain the need of memory hierarchy with the help of a block diagram. [6+4]

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10.a) What are the major characteristics of a RISC processor?

b) Draw the flow-chart of a four-segment instruction pipeline and explain with example and timing diagram. [4+6]

OR

11.a) What are the major problems with instruction pipelining? How to handle branch instructions? Explain.

b) List and explain various schemes for establishing an interconnection networks briefly. [5+5]

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