Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth semester B.Tech examinations (S), September 2020

Course Code: EC206
Course Name: COMPUTER ORGANISATION (EC)

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks

Marks

1 a) Draw the block diagram of a 16-bit ripple carry adder using full adders. Calculate the delay of a 32-bit ripple carry adder. Assume a full adder delay is 200ps. (7)

b) Express the following base 10 numbers in 16-bit fixed-point two's complement format with eight integer bits and eight fraction bits. Express in IEEE 754 single-precision floating-point format also. Express your answer in hexadecimal. (8)

  (a) -20.5   (b) 24.25

2 a) Explain any two assembly instruction formats in MIPS with examples. (6)

b) Write the operation performed in MIPS processor when it executes the following instructions (9)
  (a) add $t0, $s4, $s5
  (b) lw $t2, 32($0)
  (c) sw $s1, 4($t1)

3 a) Draw the symbol and implementation of a 4 x 4 multiplier. (7)

b) Discuss about operands and registers of MIPS processor. Write the use of $0, $gp, $sp and $t8. (8)

PART B
Answer any two full questions, each carries 15 marks

4 a) Explain five addressing modes of MIPS with example. (15)

5 a) Draw the datapath for single cycle processor for *sw* instruction. (9)

b) List the characteristics of single-cycle and multi cycle microarchitectures. (6)

6 a) How does a multicycle processor address the weakness of single-cycle processor? (7)

b) Explain the steps involved in executing a high level language program. Draw the flow chart. (8)

PART C
Answer any two full questions, each carries 20 marks

7 a) Explain any two modes of data transfer between the processor/memory and I/O devices in a computer system. (6)

   b) Draw the internal organization of a DRAM cell and explain the read and write operation. (6)

   c) Illustrate virtual address to physical address translation using page table. (8)

8 a) Define miss rate and average memory access time. (6)

   b) Draw the internal organization of a SRAM cell and explain the read and write operation. (8)

   c) Compute the size of a 4096-word x 32-bit memory array. Also find the width of address and data bus. (6)

9 a) Describe temporal locality and spatial locality with respect to cache memory. (6)

   b) Illustrate how data is found in a C=8 word, 2-way set associative cache (10)

   c) Draw the internal organization of a 4 x 3 memory array. (4)

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