POKHARA UNIVERSITY

Level: Bachelor Semester: Spring Year : 2019
Programme: BE Full Marks: 100
Course: Computer Organization and Architecture Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Describe the different types of instruction formats. 5
   b) Briefly explain instruction cycles in computer organization. 5
   c) Design a 32 B RAM using four 16x4 ROM chips. 5
2. a) Design a system that could implement the given RTL codes using direct connection: 5
   R: x←x+y
   T: x←x-y
   L: y←y^x
   b) Define RTL. Perform eight different shift operations on X=110001010001. 5
   c) Trace RTL code of Booth's Algorithm for multiplication of 9 and (-3) 5
3. a) There is a Very simple CPU for the given set of Instructions: 8

Instruction	Instruction Code	Operations
STR	00 AAAAAA	AC→M[AAAAAA]
AND	01 AAAAAA	AC←AC^M[AAAAAA]
JMPR	10 AAAAAA	PC←PC+AAAAAA
DEC2	11 XXXXXX	AC←AC-2

   Let the instruction width be 8 bits and address is 6 bits. Design the CPU's Register Section, State Diagram and ALU.
   b) Design the hardwired control unit for the CPU described in question 3 a. 7
4. a) Design a micro-sequencer control unit with verticalmicrocode for the CPU described in question 3 b. 7
   b) What is Lookup ROM? Design a Lookup ROM to implement the function f =xy+y'z. 8
5. a) What is cache memory? Briefly explain Direct and Set-Associative Mapping. 7
   b) Describe Register Windows.In a system, there are 6 windows of 8

registers, Each register share 8 input registers, and 8 output registers. Each of the windows has 4 local registers. The system has 12 Global registers. Calculate the total number of registers in the system. Show the pictorial representation as well.

6. a) What is Direct Memory Access. Briefly explain the transfer modes and I/O processors in DMA. 8

   b) What is topology? Describe about the different types of topologies used in multiprocessor communication. 7

7. Write short notes on: (**Any two**) 2×5

   a) Addressing modes

   b) Signed and Unsigned Integer notations (to note on moderation)

   c) Interrupt Driven I/Of (to note on moderation)