POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2017
Programme: BE | Full Marks: 100
Course: Logic Circuits | 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) 'Gray code is also known as reflected code'. Justify your answer with appropriate illustration. 5
   b) Determine the value of base x if $(211)_x=(152)_8$. 5
   c) Realize all the basic gates using NAND gate only. 5
2. a) Use K- map to simplify the given Boolean function in SOP from and implement the simplified function using NAND gate only. 7
   F (A, B,C, D) = ∑(5, 7, 9, 12, 13, 14, 15,) and don't care, d(A, B, C, D) = ∑ (3, 6, 8)
   b) Design a circuit of a 3-bit parity generator and the circuit of a 4-bit parity checker for odd parity. 4+4

OR

Design a combinational circuit that has four inputs and two outputs one of the outputs is high when majority of inputs are high. The second output is high only when all inputs are of same type. 8

3. a) With the help of an example, show how you can construct a higher order MUX using two or more number of lower order MUXs. 8
   b) Implement a full adder circuit with the help of two half adder circuit along with the truth table. 7
4. a) Explain the operation of clocked R-S flip-flop with the help of its logic diagram, characteristic table and characteristic equation. Differentiate RS and JK flip flop. 8
   b) Design a synchronous 4 bit binary up counter using T flip flop which counts all possible odd numbers. 7

OR

What is a modulo-7 counter? Design such a counter using JK flip–flip. 2+5

5. a) What do you mean by ALU? Design an arithmetic circuit to implement the following function table. A and B are 4 bit binary numbers. 9

S1	S0	Cin	F.
0	0	0	A
0	0	1	A+1
0	1	0	A+B
0	1	1	A+B+1
1	0	0	A+B'
1	0	1	A-B
1	1	0	A-1
1	1	1	A

   b) What is a shift register? Draw the block diagram for shifting the content of register A to register B. Describe the operation. 8
6. Compare and contrast ***any three*** of the following:
   a) Synchronous and asynchronous logic. 5
   b) Decoder and encoder 5
   c) XOR and XNOR gates 5
   d) Analog versus Digital System 5
7. Write short notes on: (**Any two**) 2×5
   a) Accumulator
   b) Don't care conditions
   c) Parity method for error detection