POKHARA UNIVERSITY

Level: Bachelor   Semester: Fall   Year : 2018
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) Define Analog and Digital Signal. Differentiate digital system and Analog system.   4

   b) Convert the following conversions: 8

       i. $(101001.101)_2 = (?)_{10}$
       ii. $(ABD)_{16} = (?)_8$
       iii. $(10101101)_2 = (?)_{gray}$
       iv. $(175.351)_8 = (?)_{16}$

   c) Define logic gates. Explain the universality of NAND and NOR gates.   3

2. a) Why NOR gate is called universal gate? State and prove De-Morgan's theorem.   8

   b) Use K-map to simply the given Boolean function with don't care condition and realize it using basic gates only: $F = \sum(1,4,8,12,13,15)$ and $d = \sum(3,7,11,14)$.   7

3. a) Design a combinational logic circuit that has four-input 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

   b) Design a circuit for 3-bit parity generation and 4-bit parity checker using odd parity.   7

4. a) A combinational circuit is defined by the function,   8

   $F_1(A,B,C) = \sum(3,5,6,7)$
   $F_2(A,B,C) = \sum(0,2,4,7)$, implement by using PLA.   7

   b) What is magnitude comparator? Design a two bit magnitude comparator whose outputs are A>B, A<B and A=B.

5. a) Design a sequential circuit corresponding to the given state diagram using S-R FlipFlop for the following state diagram.   8
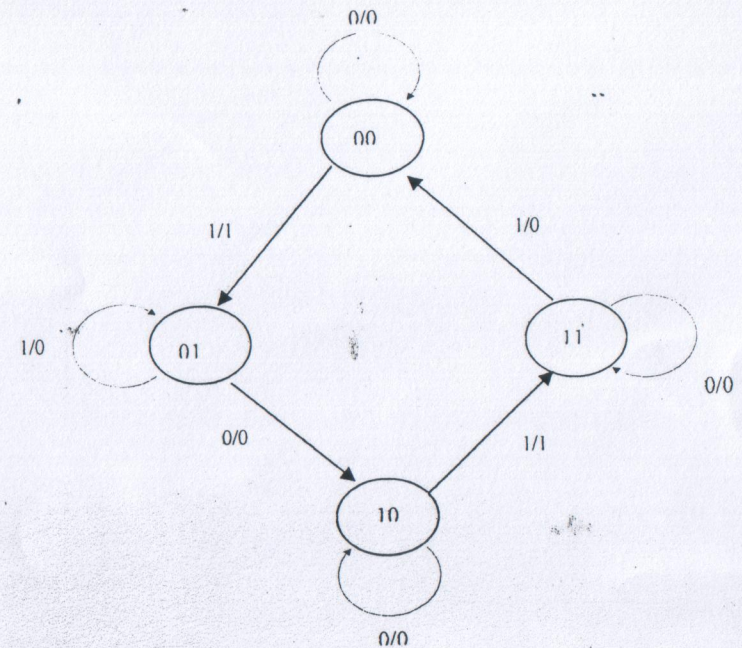
   b) With necessary logic diagram, truth table, excitation table, explain the operation of J-K flip flop.   7

6. a) What is shift register? Explain serial in parallel out and parallel in parallel out shift registers.   7

   b) Design a 4-bit arithmetic circuits which performs eight different arithmetic operations.   8

7. Write short notes on: (**Any two**)   2×5
   a) Counters
   b) Master –slave Flip Flop
   c) Nibble Adder