POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Logic Circuits

Semester: Spring

Year : 2017
Full Marks: 100
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) Explain the digital Number system. Differentiate between analog and digital system. 5
   b) Perform the following subtraction using 2"s Compliment method 5
      i. (1000100)2-(1010100)
      ii. (11010)2-(10000)2
   c) What are the different types of Binary Codes? Explain each in brief. 5
2. a) How can you find the r's complement using (r-1)'s complement? Explain with example. 3
   b) "Excess 3 code is self complementary code" verify the statements 4
   c) What are the universal gates? Why they are called so? Construct NAND gate using NOR gate and NOR gate using NAND gate. 3+5
3. a) Use K-map to simplify the given Boolean function and once by considering the don't care condition and once by ignoring the don't care condition and realize it using the basic gates $F(A,B,C,D) = \sum(1,4,8,12,13,15)$ and don't care, $d(A,B,C,D) = \sum(3,14)$. 8
   b) 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. 7
4. a) Design a combinational circuit using PLD device as PLA(4*8*4) which is used to implement the full adder functions in which sum represented as Si and carry represented as Ci+1. 7
   b) How the drawback of RS flip-flop is overcome in J-K flip-flop? Explain the J-K flip-flop in detail. 8
5. a) Define counter. Design a BCD counter that counts the binary sequence from 0000 to 1001 and returns to 0000 to repeat the sequence using T-flip-flops. 7
   b) Explain the operation of RS flip-flop with the help of characteristics table. How it can be converted into T-flip-flop? 8
6. a) Design a synchronous binary 3- bit up counter using R-S flip-flop. 7
   b) Draw arithmetic circuit logic diagram. Design arithmetic circuit with function table that perform eight major functions. 8
7. Write short notes on: **(Any two)** 2×5
   a) Venn diagram
   b) Master Slave Flip Flop
   c) Edge Triggered flip-flop