POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Digital Logic

Semester: Fall

Year : 2022
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) Define positive and negative logic system. Explain digital number system. Differentiate between digital systems over the analog system. 7

   b) Perform the following Conversions. 8

   i. $(10101101)_{gray} = (?)_2$

   ii. $(175.351)_8 = (?)_{16}$

   iii. $(584)_{10} = (?)_{Excess-3}$

   iv. $(7436)_{10} = (?)_{2421}$

2. a) Simplify the following function F in (1) sum of products and (2) product of sums using K-map 7

   $F(A, B, C, D) = \Sigma(0,1,2,,6,11,13,14)$

   OR

   Verify De-morgan's theorem for three variables using truth table.

   b) Why NAND gates and NOR gates are called universal gates? Verify with examples. 8

3. a) Explain (r-1)'s complement with example. "84-2-1 code is a self-complementing code". Justify your answer with illustration. 9

   b) List out application of shift register. Draw circuit diagram for 6-bit parallel in serial out shift register. 6

4. a) Design Full adder circuit and draw the logic diagram. 8

   b) Define Multiplexer and Implement the following Boolean function $F(w,x,y,z) = \Sigma_m(1,3,6,7,11,15)$ using 8 to 1 Multiplexer 7

5. a) Find out the logical expression of two bit magnitude comparator and draw the circuit diagram. 8

OR

A combinational circuit is defined by the function $F_1(X,Y) = XY + XZ'$ and $F_2(X,Y) = XZ' + YZ$

Implement the circuit with a PLA having three inputs, three product terms and two outputs.

b) Design a 3 bit synchronous binary up counter using T flip-flop. 7

6. a) What are the significance of a flip-flop? Explain R-S flip-flop along with its logic diagram, truth table, characteristic table and excitation table. 9

   b) With suitable example explain about the state reduction and binary assignment. 6

2×5

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

   a) Arithmetic and logical unit

   b) Status register

   c) Random Access Memory