RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. FIRST SEMESTER EXAMINATION, DECEMBER 2013

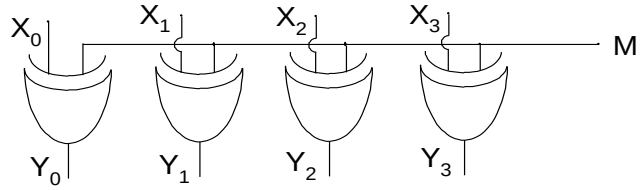
FIRST YEAR

Date : 19/12/2013 **Electronics (General)**

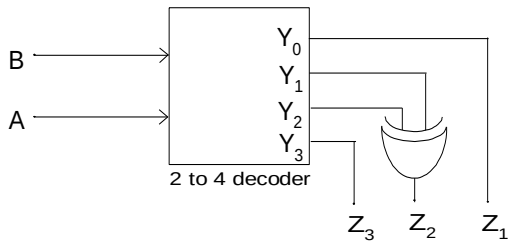
Time : 11am – 1pm Paper : I Full Marks : 50

Answer **any five** of the following questions: (5 × 10)

1. a) Convert the hexadecimal number $(A7FE)_{16}$ into octal. (2)
   b) Subtract $(0111)_2$ from $(1001)_2$ using 2's complement method. (4)
   c) Convert the binary number $(1011)_2$ to gray code. (2)
   d) Convert the binary number into its corresponding BCD format: $(1001011)_2$. (2)
2. a) Simplify the following function using K -map and write down the expression in SOP form.
   f (A, B, C, D) = $\sum_m (0, 1, 2, 7, 8, 9, 11) + \sum_d (6, 10, 12, 13)$. (6)
   b) Implement a three input NAND gate using two input NAND gates only. (2)
   c) Show the output for M = 1 & M = 0. Comment on the result (2)



3. a) Implement the following Boolean function using 4 to 1 multiplexer.
   F (A, B, C, D) = $\sum_m (0, 1, 2, 4, 6, 9, 12, 14) + \sum_d (3, 5, 7)$. (6)
   b) Write down any two important differences between latch and flip-flop. (2)
   c) Construct an OR gate using 2 input NAND gate. (2)
4. a) Construct a decade asynchronous up counter using JK Flip-flops with neat logical circuit diagram and explain its operation. (8)
   b) Write down any two important differences between synchronous and Asynchronous counter. (2)
5. a) Design a full adder using 3 to 8 decoder along with basic Logic gates if required, with neat logical circuit diagram. (6)
   b) Show that multiplexers are universal function generator. Explain with suitable example. (4)
6. a) Implement full subtractor using 1 to 8 demultiplexer along with basic logic gates if required. Explain with neat circuit diagram. (5)
   b) Design a 5 to 32 decoder using one 2 to 4 decoder and four 3 to 8 decoder. (5)
7. a) Draw and explain the operation of a JK master slave flip-flop using 2 input NAND gates only. (6)
   b) What is race around condition? (2)
   c)



Comment on the output of the above circuit. (2)