END TERM EXAMINATION

FIRST SEMESTER **[MCA]** DECEMBER **2007**

Paper Code: MCA103 **Subject: Digital Electronics**

Time: 3Hours **Maximum Marks: 60**

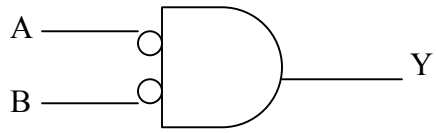
Note: Attempt any Five question.

Q1. (a) The logic levels for two typical logic circuits A and B given below:-

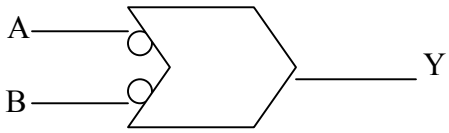
A: 0.4V and 2V
B: -0.75V and –1.55V

Express these levels in binary form assuming positive logic system.

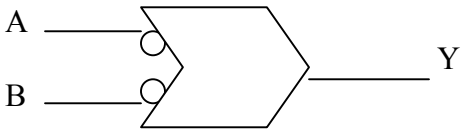
(b) Construct truth table for each of the following gates and name the operation performed in each case.

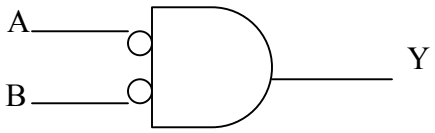


(i)



(ii)





(c) Prove the following: -

(i) $\overline{A + B} = \overline{A} + \overline{B}$

(ii) $B + (B + A.C) = A.C$

Q2. (a) Encode the decimal numbers 46 and 327.89 in (i) Excess-3 code (ii) BCD code.

(b) Determine the memory requirement for storing 1000 names of students assuming that no Name occupies more than 20 characters (including spaces) in 7-bit ASCII code with parity bit.

(c) Perform the following subtraction using 2's complement method: -

(i) 01000-01010

(ii) 0011.1001-0001.1110

Q3. (a) Realize the logic expression using 4 to 6 line decoder with active low outputs and NAND Gates $f(A, B, C, D) = \pi M(0,1,3,7,9,10,11,13,14,15)$

(b) Minimize the logic function using K-map.
$F(A, B, C, D) = \Sigma m(1,2,3,5,8,9,11,13,15)$.

Q4. (a) Implement a single digital BCD adder using two 4-bit adders and minimum number of

gates.

(b) Implement a BCD-to-Gray code converter using 8:1 multiplexers.

Q5. (a) Explain the operation of a 5-bit shit register and implement Johnson counter using it.

(b) Design a 3-bit synchronous UP/DOWN counter using J-K flip-flops.

Q6. (a) Implement a Schmitt trigger circuit using an OP-AMP and explain its operator.

(b) Design a decode ripple counter using J-K flip-flops.

Q7. (a) Explain the principle of analog to digital conversion.

(b) What will be the number of comparators and resistors required for a flash ACD?

(c) Determine the number of 1024x4 bit RAM ICs required for constructing 4096x8 bit RAM.

Q8. (a) Explain the internal structure of a PLA device.

(b) Explain the flags of 8085 microprocessor.

(c) How many different instruction are possible in an 8-bit microprocessor? Justify many your answer.