(Please write your Exam. Roll No.) Exam. Roll No. 02114202010

END TERM EXAMINATION

SECOND SEMESTER [BCA], MAY – 2011

Paper Code : BCA 106	*Subject : Digital Electronics*
Paper Id : 20106	

Time : 3 Hours *Maximum Marks : 75*

Note : Question 1 is compulsory. Attempt One question from each unit.

Q. 1. Attempt any **Five** questions : **(5×5=25)**

(a) State truth table for a three input OR gate.

(b) State Morgan's theorems. Show that $\overline{ABCD} = \overline{A}C + \overline{B}C + \overline{D}$

(c) Describe logic circuit of a 1 to 2 demux.

(d) Explain the operation of a decimal to BCD encoder,

(e) Define set up time, hold time, edge triggered, level triggered and Toggle.

(f) Differentiate static and dynamic RAM.

(g) Give applications of MUX and deMUX.

UNIT - I

Q. 2. (a) Prove : (i) $(A+B)(A+C) = A+BC$

(ii) $A + \overline{A}B = A + B$ **(6)**

(b) Simplify : $X = A\overline{B}D + A\overline{B}\,\overline{D}$

$Y = [A\overline{B}(C+BD) + \overline{A}\,\overline{B}]C$

$Z = \overline{(\overline{A}+C)+(B+\overline{D})}$ **(6.5)**

Q. 3. (a) Explain SOP and POS forms of Boolean expressions with examples. (6.5)

Convert $(A+\overline{B}C)C$ to SOP

Convert $(A+\overline{B})(B+C)$ to POS

(b) Construct logic circuits that can implement the following expressions

$\overline{A}BC$

$BC(AB+\overline{C})$ (6)

UNIT - II

Q. 4. (a) Explain the logic implementation of a half-adder and show that a full adder can be implemented using two half-adders. (8)

(b) In a half-adder having two inputs A and B and two outputs sum(s) and carry(c), write Boolean expressions for sum and carry in terms of A and B. (4.5)

Q. 5. (a) Draw a functional diagram of a general digital mux and logic circuit of a two input MUX. Explain its working using timing diagrams and truth table. (10)

(b) How is a multiplexer used to implement logic functions directly from Truth Table? Show that 8 input MUX is required to implement 3 variable truth table. (2.5)

UNIT - III

Q. 6. (a) Show that a NAND and a NOR latch are flip flops. Explain three forms of flip flops used in Logic circuits. (5)

(b) While a JK flip flop can be used as a SC flip flop but a SC flip flop cannot be used as a JK flip flop. Explain. (2.5)

(c) Show the working of clocked S-C flip flop using Truth Table and Waveform. (5)

Q. 7. (a) Why is a shift register required? Explain the working of a serial-in and serial-out four bit shift register and give its applications. (10)

(b) How long will it take to shift a 8 bit number into a shift register if the clock is set at 10MHz? (2.5)

UNIT - IV

Q. 8. (a) What is a Binary counter? Explain how a basic 3 bit asynchronous counter can be constructed using flip flops. Draw waveforms associated with the counter. (10)

(b) List merits and demerits of a synchronous and asynchronous counter. (2.5)

Q. 9. (a) Describe various types of memory devices used in computer systems. (6)

(b) Memories can be classified into sequential, RAM, ROM and COM. State the principle of operation and differentiate them. (6.5)

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